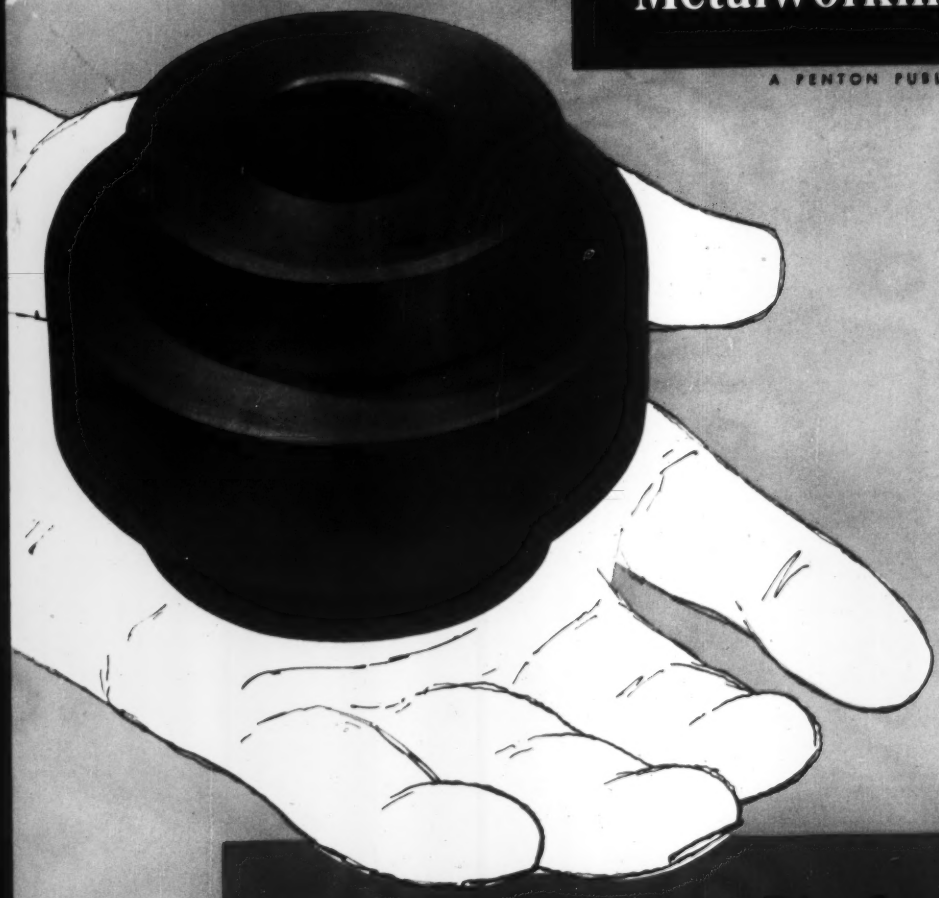
DECEMBER 3, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Trim Component Costs with

POWDERED METALS

Parts now can be made larger, more intricate with new presses . . . page 121

production ideas

NO. 6 OF A SERIES

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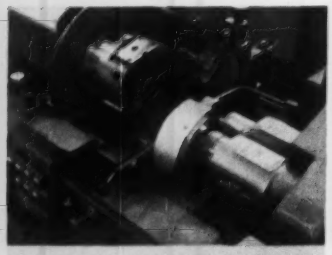
8 Ways to COMBINE

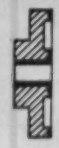
BORE and FACE GRINDING OPERATIONS

with Heald Multi-Spindle Internals

SIMULTANEOUS Bore and Face Grinding with SLIDE-BAR FACING

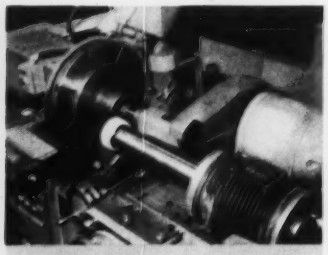
Bore grinding wheel reciprocates with table while facing wheel, mounted on anti-friction slide bars, is held forward against work under spring pressure. Face feeding stop controls depth of face grind.





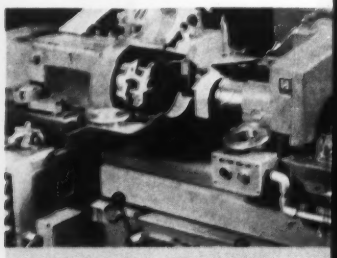
SEQUENTIAL Bore and Face Grinding with MANUAL FACING

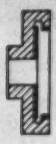
Face is first plunged with manual facing attachment, while bore wheel enters bore without contacting work. Bore is then ground in Size-Matic cycle (facing wheel positioned to clear work on instroke).



SEQUENTIAL Bore and Face Grinding with RETRACTABLE FACING HEAD

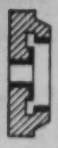
With motorized facing wheelhead in extended position, face is plunge ground with manual feed (bore wheel is clear of work). Workhead is indexed forward and bore ground in Size-Matic cycle.





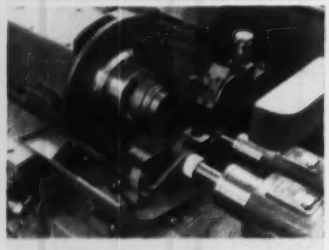
SIMULTANEOUS Bore and Bottom Face Grinding with SINGLE WHEELHEAD

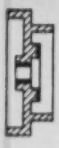
Combined bore and facing wheel feeds against work while workhead feed is operating, grinding face to finish size and plunging bore to semi-finish size. Wheel plunges bore to finish size while held clear of face.



SEQUENTIAL Grinding of Two Bores and Bottom Face with SPACED WHEELHEADS

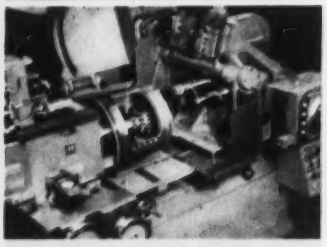
Small bore first ground to size (second wheel clears work), then workpiece is indexed forward in front of second wheel. Large bore is plunge ground and at same time wheel is fed forward to face grind bottom face.

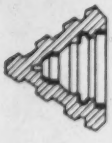




SEQUENTIAL Bore and Bottom Face Grinding with SPACED WHEELHEADS

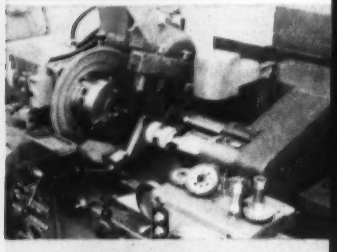
With workhead in rear position, bore is ground in Size-Matic cycle (facing wheel spaced to clear work). Work is then indexed forward and face is plunge ground to finish size, (bore wheel clears work).

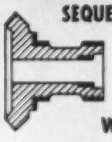




SEQUENTIAL Plunge Grinding of STRAIGHT AND CONTOUR BORES

Two wheelheads first plunge grind large straight bore and spherical ball race. Work is then indexed forward and small combined straight and taper bores are plunged with shaped wheel.





SEQUENTIAL Grinding of I.D., O.D. and FACE with Spaced Wheelheads

Bore is first ground to finish size with workhead in rear position (face and O.D. wheels clear of work). Workhead indexes forward and bottom face and two O.D.'s are plunge ground with double wheel.

WHENEVER two or more grinding operations can be done at a single chucking, you convert handling time into *grinding time*. What's more, you get a more positive relationship between ground surfaces than could be obtained by any other method. Here are eight different Heald setups for performing such combined operations quickly and economically. For complete information, send for a copy of new Bulletin No. 2–69–2.

It PAYS to come to Heald!

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THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

When snow still stands for fun

To "old timers" like us, snow means slippery streets, snarled traffic, tiresome shoveling. But to the eager lad in our picture, snow stands for *fun*. Fun with his new sled, especially. Yes, what greater thrill than swiftly skimming down a snowy slope, the crisp air nipping your cheeks—remember?

At the time you hardly gave a thought to the slender yet strong steel runners that sped you along. But today those runners are worth thinking about. Since they must be shaped just right to do the job best, they are specially rolled. For the same reason, manufacturers of products ranging from scraper blades to steel sash, from bridge flooring to brake shoes, use special shapes, hot-rolled by Bethlehem to their drawings and specifications.

These customers use "tailor-made steel" to avoid unnecessary machining, welding, flame-cutting and other fabricating operations; to cut down scrap losses; to achieve better product design. Perhaps you, too, could make special sections pay in a big way. We'd be happy to discuss it with you. Just call or write the nearest Bethlehem sales office.

A SLED MAKES A GREAT CHRISTMAS GIFT!

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BETHLEHEM STEEL

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..ask for a sample bar of LaSalle's revolutionary

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..the bar that has HIGH STRENGTH without heat treating

Yes, La Salle invites you to test a sample bar of the remarkable new FATIGUE-PROOF. This amazing new material is its own best recommendation . . . as proven by the many original equipment manufacturers who have already tested (and are using) FATIGUE-PROOF.

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If it appears that FATIGUE-PROOF can help you improve your product and cut your cost, he will arrange to provide the necessary test sample at no expense to you.

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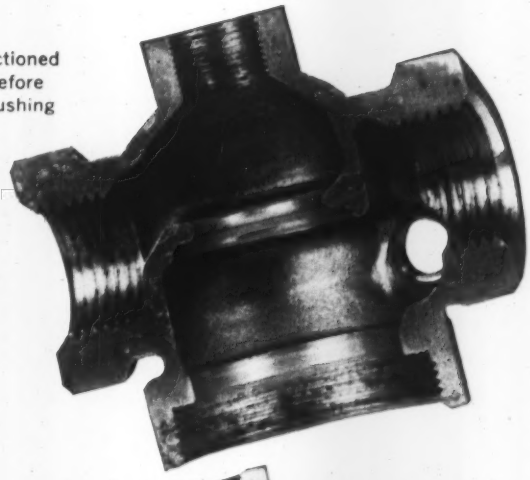
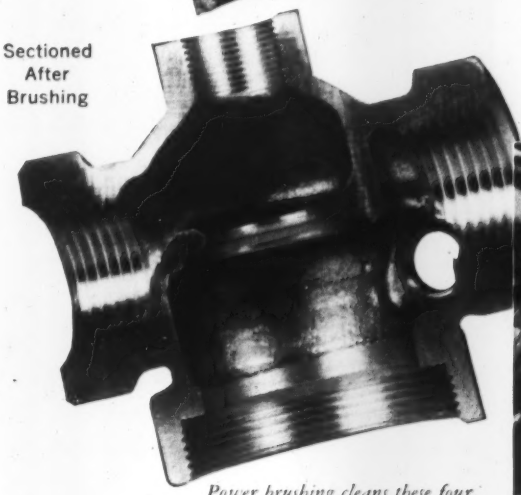
OSBORN BRUSHING METHODS worthy of your confidence

Solving an inside job

Sectioned Before Brushing



Sectioned After Brushing

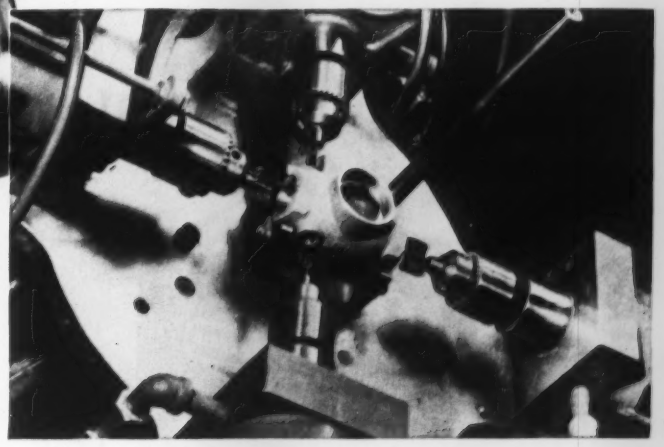


Power brushing cleans these four threaded holes 66% faster than previous method.

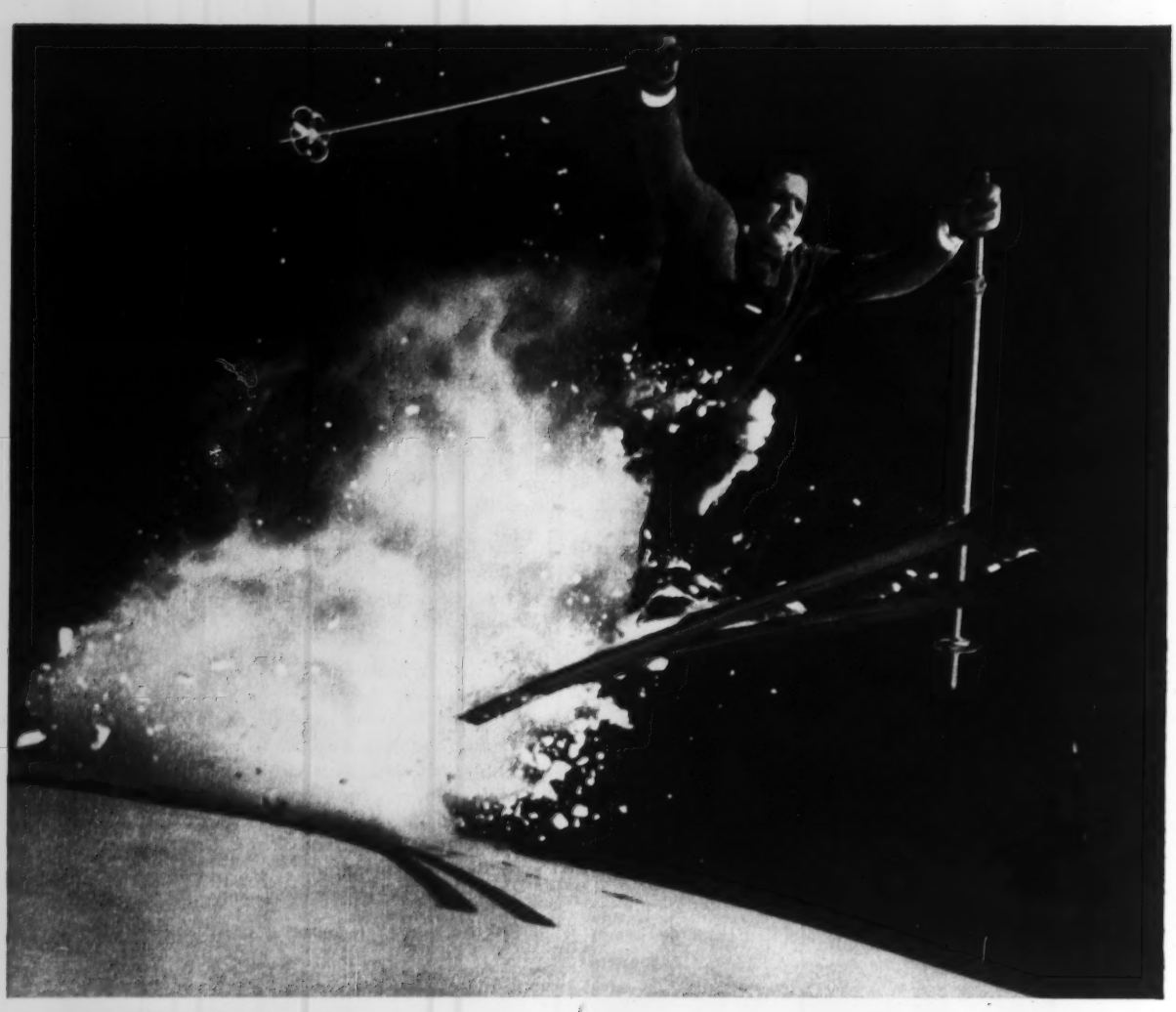
● Removing burrs and metallic particles from threads inside this valve body was once a tedious, time-consuming hand operation.

Today, using Osborn Situft® Brushes and a simple power brushing setup, the four threaded ports in this valve are deburred and cleaned in one operation . . . *saving eight manhours per 1000 parts.*

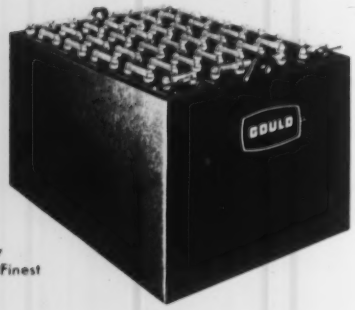
This and hundreds of other metal cleaning and finishing improvements made possible by power brushing are the reasons why Osborn has earned industry's confidence. An **O**sborn **B**rushing **A**nalysis, made at no obligation, will show how *you* can make substantial savings on many types of production with Osborn Power Brushing. Write *The Osborn Manufacturing Company, Dept. G-49, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



Osborn Brushes



LEAP ... but not before you look at Gould's "extra-value" features:



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You'll agree, the leap to Gould smooths out all battery problems. Be sure to specify Gould. Gould-National Batteries, Inc., Trenton 7, N.J.

Always Use Gould-National Automobile and Truck Batteries

gould
BATTERIES

More Power to you from Gould

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The Metalworking Weekly

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WHAT'S NEW in REFRACTORIES for the STEEL INDUSTRY

There is something new under the sun. It's new **C & G Mix** by WALSH . . . an economical mix for lining and patching ladle wells in open hearth and electric furnace shops.

Formulated to offer greater protection against washouts, it has remarkably easy workability and is low in cost, affording you greater dollar value through increased service life.

Packed dry in 100 lb. bags, Walsh **C & G Mix** is also available in bulk.

Write for complete details.

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FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes

Out of the Dust

The story about powdered metal products (page 121) will interest cost-conscious manufacturers of metal parts. After all, production and design engineers always perk up when they consider materials and parts that offer higher quality, longer life, greater factors of safety, mass production economies and other considerations so dear to the hearts of advertising copywriters.

As everybody knows (including us, because we just looked it up) powder metallurgy is a method of forming metal parts from fine metal powders compressed to shape by mechanical means and held in shape by bonding the molecular edges of the powder particles under heat. If that sends you, here's something else to file away in your catalog of astounding information: Powdered tungsten (cold-pressed, sintered, hot-worked and drawn into wires for electric light filaments) has a tensile strength as high as 600,000 psi.

Background information on powdered metal products is just as interesting as descriptions of their use. Five thousand years ago the Egyptians hammer-bonded iron ore. Five hundred years ago the Incas sinter-bonded gold, silver and platinum. Less than 150 years ago William Hyde Wollaston press-bonded platinum—and the chances are you have never read a history of powdered metals that is shorter than this one.

Powder Pioneer

Wollaston was quite a character. When he wasn't messing around with chemistry, he practiced medicine—because he was graduated as a medical doctor from Cambridge in 1793, and his profound interest in chemistry probably enabled him to compound some of the better prescriptions of the day. STEEL's article on powdered metals doesn't refer to Dr. Wollaston, partly because it is more concerned with modern production methods, and partly because the good doctor hasn't been in the news much since 1820, when he received the medal of the Royal Society in recognition of his discovery of the malleability of platinum.

By the way, that medal brought him $150,000. In the days before income tax, that was a pretty lump—far prettier than any he ever took from his laboratory crucibles.

Unfinished Business

We're so far off the beaten track down here under the steam pipes, news doesn't always get here in time for leisurely contemplation. Information received lately has thrown us into a tizzy because of the lack of additional intelligence. Put yourself in our position, please. On Oct. 29, John L. Farley, director of the Fish & Wildlife Service, called an international conference to consider the problem of the whooping crane. Like every red-blooded, 100-per cent, loyal American, we're nuts about whooping cranes—all 27 birds left alive.

Well, what happened at that conference? Did any whooping cranes turn up? We've been waiting for STEEL's Washington correspondent, James Morrissey, to bring us up to date, but he's been so busy with his "Windows of Washington" for industrial readers he just plumb forgot those poor, neglected, ever-lovin', almost-gone whooping cranes.

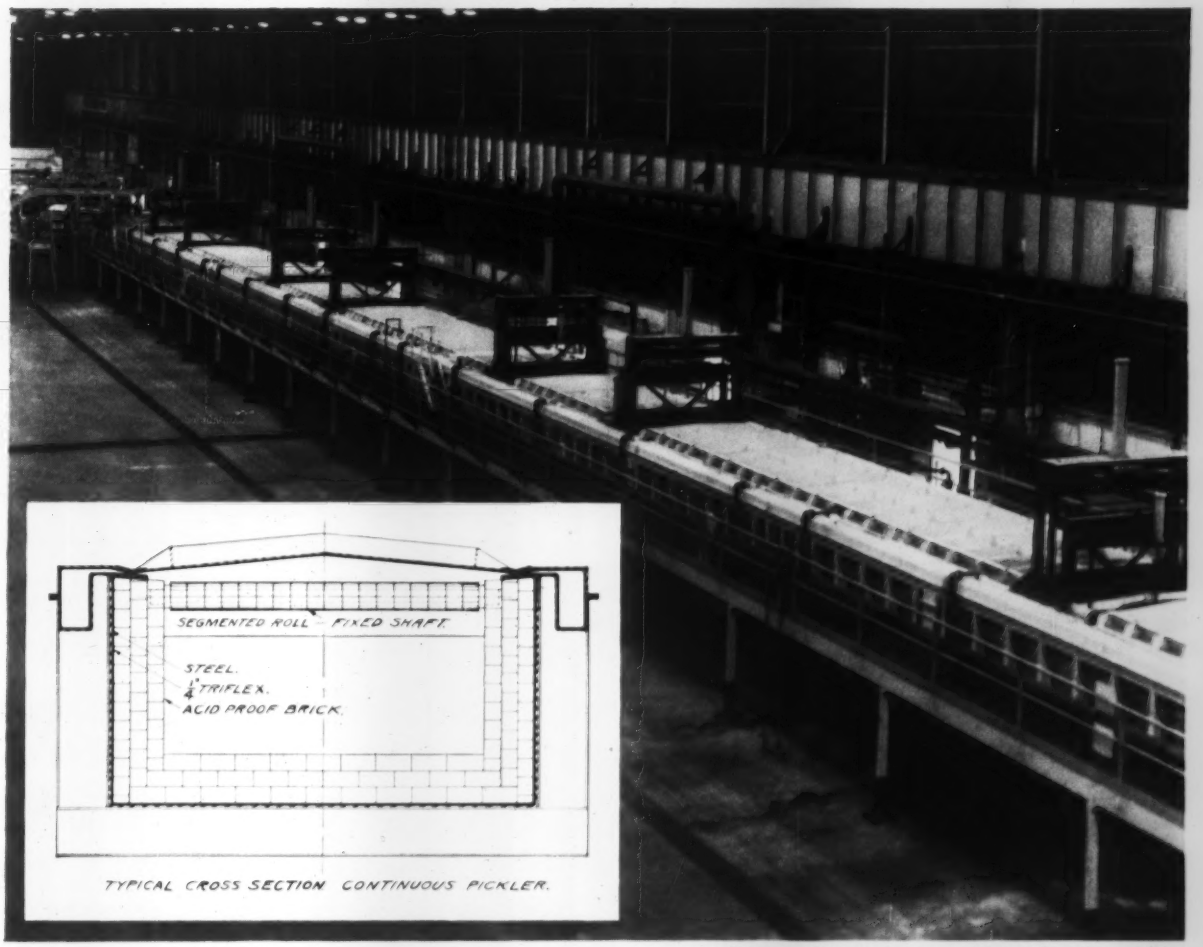
Washington, of course, is a real never-never land of ordered confusion. One of our favorite bits of reading is the list of selected U.S. Government publications issued biweekly by the Superintendent of Documents, Government Printing Office. Last week we were tempted to invest 30 cents in 17Y Catalog No. I 53.8:957. It was all about the Ephemeris, 1957, of the sun, Polaris, and other selected stars, with companion data and tables for the year 1957. This dandy little old catalog will straighten you out on the hourly changes in declinations, upper culminations and elongations of Polaris, and it's nonsense to pretend that any taxpayer is better off without this handy guide.

However, 30 cents is 30 cents, and sometimes this amount has been known to purchase a pot of beer. In this case (Alas, Polaris!) it did.

Shrdlu

(Metalworking Outlook—Page 73)

B.F.Goodrich



Continuous pickling line engineered and built by Wean Engineering Co.

Continuous pickling line at work 4 years, looks good for years more

THE high speed, efficient pickling line at U. S. Steel's Fairless Works is now in its fourth year of continuous service with only a minimum of maintenance. The reason: B. F. Goodrich Triflex rubber lining. The result: big savings through lowered pickling and maintenance costs.

Twenty years ago such tanks were an innovation. Today, the steel, rubber and brick pickling tank is a standard specification. But the fact remains that just any tank of this type construction will not solve your pickling problems. It is B. F. Goodrich Triflex lining that ends leaks. This lining is not one layer of rubber, but three—hard rubber for acid resistance sandwiched between soft rubber for protection—with expansion joints which let the rubber expand and contract with the steel to which it is attached.

Remember, Triflex lining and expansion joints, the Vulcalock and Unilock processes for attaching rubber to steel, and brick sheathing are all B. F. Goodrich developments. Out of the hundreds installed during the past 25 years, not one has ever failed to end costly shutdowns for repairs and all other forms of pickling tank troubles.

Your specification of a B. F. Goodrich rubber-lined tank brings you, in addition to these proven construction features, the engineering experience of a group of men who are thoroughly grounded in modern pickling practice and capable of designing tanks to your individual needs. It is this record of past performance and experience which insures the economy and efficiency of every B. F. Goodrich installation. *B. F. Goodrich Industrial Products Co., Dept. M-781, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

FLYING PRESS

On this page are pictured over 400 aluminum pie plates. Those printed in red indicate one minute's production made on conventional equipment. Those in black are the "bonus" the Wean "Flying Press" can provide. A production increase of nearly 300%.

Just 1 Minute!

You are looking at 60 seconds worth of Wean *Flying Press* production

Over 400 aluminum pie plates, of .002 gage strip, in just one minute! During a demonstration run of the "Flying Press" in the Wean Testing Laboratory, another "conventional press" record fell by the wayside — this time the products were four-inch diameter pie plates, of hard-to-handle .002 gage aluminum strip. The Wean "Flying Press," fitted with the same dies used on the old-type press, nearly quadrupled the normal production limit of 110 per minute.

This bit of magic wasn't done by mirrors — it was the result of an entirely new type of industrial press. The revolutionary Wean "Flying Press" features a continuous-feed design that allows for much greater speed and increased accuracy. It eliminates the clutch and brake which are integral parts of the old intermittent feed presses, and hence reduces press maintenance costs which center largely in these areas.

If you are performing a blanking, piercing, notching or shallow draw operation on either light or heavy gage strip, you can't afford to ignore this revolutionary new press. The first step to adding the Midas touch to *your* balance sheet is to make an appointment for a demonstration of the Wean "Flying Press." Write today — Wean Equipment Corporation, 22800 Lakeland Boulevard, Cleveland 17, Ohio.

Wean EQUIPMENT CORPORATION

CLEVELAND • CHICAGO • DETROIT • NEWARK, N. J.

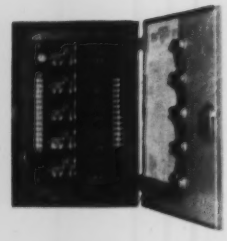
FIRE! HOW TO DETECT AND EXTINGUISH IT IN SECONDS!

HAND PORTABLES

Carbon Dioxide | Foam Soda-Acid Clear Water Anti-Freeze | Pressurized Water Anti-Freeze | Dry Chemical

Kidde CO_2 portables, either trigger-release type or squeeze-valve type models, are available in sizes from 2½ to 20-pound capacities. New Kidde Wet Chemical Extinguishers are available in 2½ gallon bronze or stainless steel models, including pressurized Water or Water-Anti-Freeze units (illustrated). Kidde Dry Chemical extinguishers are available in cartridge-operated models of 20 and 30 pounds capacity or pressurized models of 5 and 10 pounds capacity.

ATMO DETECTING SYSTEMS

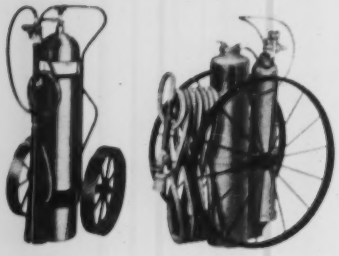


Kidde-Atmo is a wide-area automatic fire detecting and warning system which works on the principle of rate-of-temperature-rise. It is ideally suited for cases where life protection is of vital importance, or where quick, early detection of fire in valuable materials is essential.

The very first hot breath of fire triggers the system, and sounds the alarm. In addition, the system can also close doors, shut off fans or blowers – all *automatically*.

What's more, the Kidde-Atmo system operates independently of regular power sources, will still give protection even if outside power fails.

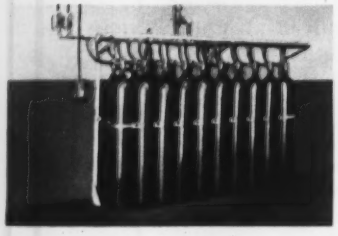
MOBILE EQUIPMENT



CO_2 | Dry Chemical

For major fire hazards, get a mobile unit. Wheeled CO_2 units are available in 50, 75 and 100-pound capacities, in one clyinder. 150-pound Dry-Chemical unit has straight stream for long range . . . fan pattern for wide coverage. Both units give expert results even with inexperienced operator.

CO_2 SYSTEMS



New Kidde pressure-operated CO_2 extinguishing systems are individually designed to fully protect even the most dangerous hazards. Directional Valves afford protection to more than one hazard using the same bank of CO_2 cylinders.

Kidde

Walter Kidde & Company, Inc.
1260 Main Street, Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal — Toronto

LETTERS TO THE EDITORS

Best Presentation of Subject

I have read with interest the article, "Hydrogen Embrittlement of Steel" (Nov. 12, page 138). This appears to be the best presentation of the subject I have seen. Because it fits our situation so exactly, I would appreciate receiving six copies.

Louis J. Gamache
Chief Inspector
Motorola Inc.
Chicago

Automation Story: Provocative

Your article, "Automation—Bogeyman or Bonanza?" (Oct. 15, page 109), is interesting and provocative. May I have a copy for our reference library?

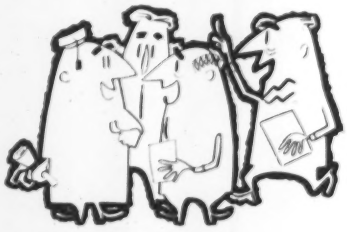
J. D. Byrne
Light Mfg. & Service Industries
Sales Development Unit
Apparatus Sales Division
General Electric Co.
Schenectady, N. Y.

Problem Solver

Please forward a copy of the article, "Stainless in Aircraft Design" Parts I and II (Nov. 5, page 142 and Nov. 12, page 152). We feel this article will be valuable to us in dealing with aircraft companies and their heat treating and equipment problems.

N. K. Koebel
Manager-Heat Treating Furnace Division
Lindberg Engineering Co.
Chicago

Contribution to Industry



I have just read your article No. 10 in the 1956 Program for Management series, "Industry and College: Partners in Development" (Nov. 12, page 119).

The entire series is a worthwhile contribution to industry. This article is of such importance that I should like 20 copies for distribution to our management committee, advisory group and Tektronix Foundation.

Congratulations on a splendid job and keep up the good work.

Scott Foster Jr.
Purchasing Agent
Tektronix Inc.
Portland, Oreg.

Fifty-Year STEEL Subscriber

Please forward my copy of STEEL to the enclosed California address until Apr. 1, 1957.

I have directly and indirectly been a subscriber and reader of *Iron Trade Review* and STEEL for over 50 years. I want to keep up to date on the progress in steel.

At 68, I am passing into semiretire-

(Please turn to page 12)

for faster aluminum service?

No need to keep prospecting for a better aluminum source – once you're acquainted with fast, reliable Frasse warehouse service. Frasse knows the metal-working industry's needs – is geared in facilities and know-how to provide them. Each order, large and small, is processed with time-table precision by Frasse trained personnel . . . and rushed to your plant – fast.

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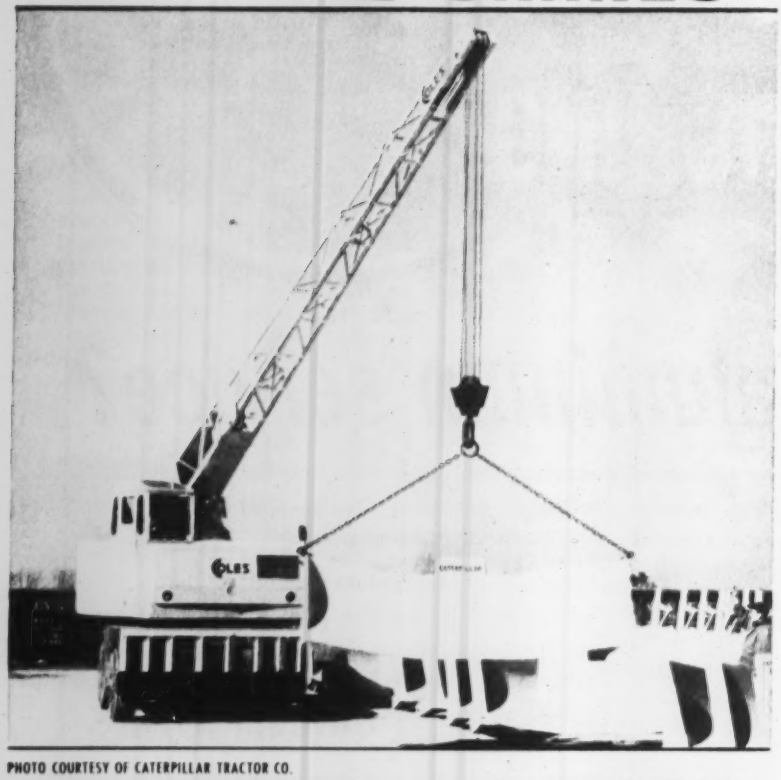

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SMOOTH POWER: COLES develop highest torques at lowest revs for controlled, balanced power.

LETTERS

(Concluded from page 10)

ment from Columbia Steel & Shafting Co. and Summerill Tubing Co. of Carnegie, Pa., continuing in the official capacity of director and engineering consultant.

Harrison M. Brightman Sr.
491 McCully St.
Pittsburgh

Apprentices To See Article

We note with interest your article, "Metalworking Tackles the Satellite" (Oct. 15, page 120). This is the type material we like to use in teaching apprentices in our trade school. We would like 20 copies for our class in the Apprentice Training School at the San Francisco Naval Shipyard.

George M. Gourdier
Apprentice Supervisor
San Francisco Naval Shipyard
San Francisco

Article Motivates Letter

Your article, "Motivating Men To Produce More" (Sept. 24, page 105), has motivated me into writing you and requesting a copy which I can read and reread.

Elwood F. Luedtke
General Planning
Caterpillar Tractor Co.
Peoria, Ill.

After reading the first eight parts of your ten-part Management series, we are aware that these articles must be placed in our files as LIVE reference materials. May we have copies?

Wayne L. Lowry
Management Development
Great Lakes Steel Corp.
Ecorse, Mich.

Story to Policy Making Body

Please send a copy of the article, "Extra Hands for Engineers," which appeared in the May 7 issue (page 53).

Will you please grant permission to copy this article for circulation (with proper credit) to members of our policy making body?

C. David Eddy
Training Department
Missile Operations
Chrysler Corp.
Detroit

• *Permission granted.*

Commended for Initiative

I would appreciate a copy of your excellent Metal Selector (insert in Oct. 1 issue). It is an extremely useful aid to designers, and you should be commended for your initiative in bringing it out.

V. H. Pavlecka
Project Engineer
Special Project
American Machine & Foundry Co.
Brooklyn, N. Y.

Please forward a reprint. It promises to be a most useful tool.

Robert N. Green
Fuel Control Engineering
AC Spark Plug Division
General Motors Corp.
Milwaukee

Please send me a copy, posthaste! It looks great.

J. R. Stockner
Mechanical Development Engineer
Hawthorne Works
Western Electric Co. Inc.
Chicago

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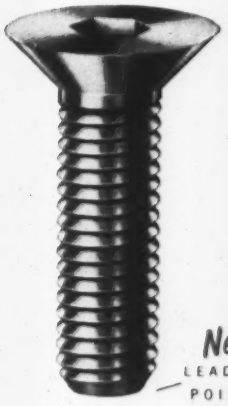
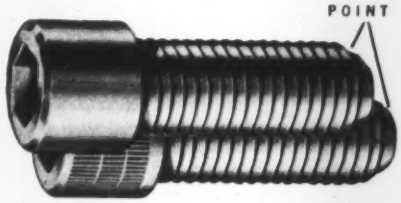
GRIP HEAD CAP SCREWS
The world's easiest starting, straightest driving, firmest holding cap screws.



FLAT HEAD CAP SCREWS
For firm fastening with flush surfaces. Especially adapted to fastening thin plates and sheets.

BUTTON HEAD CAP SCREWS
Produces smooth streamlined appearance where countersinking is impractical.

STAINLESS STEEL



Bright, non-corroding high tensile strength type 18-8. 151 popular sizes (NC & NF) with Smooth Heads *available from stock*. Also standard with Grip Heads in many popular sizes.

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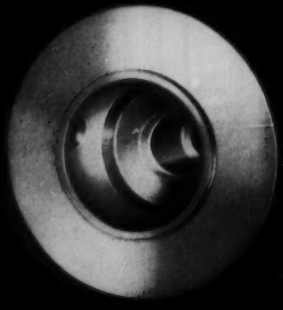
ALLEN HEAD

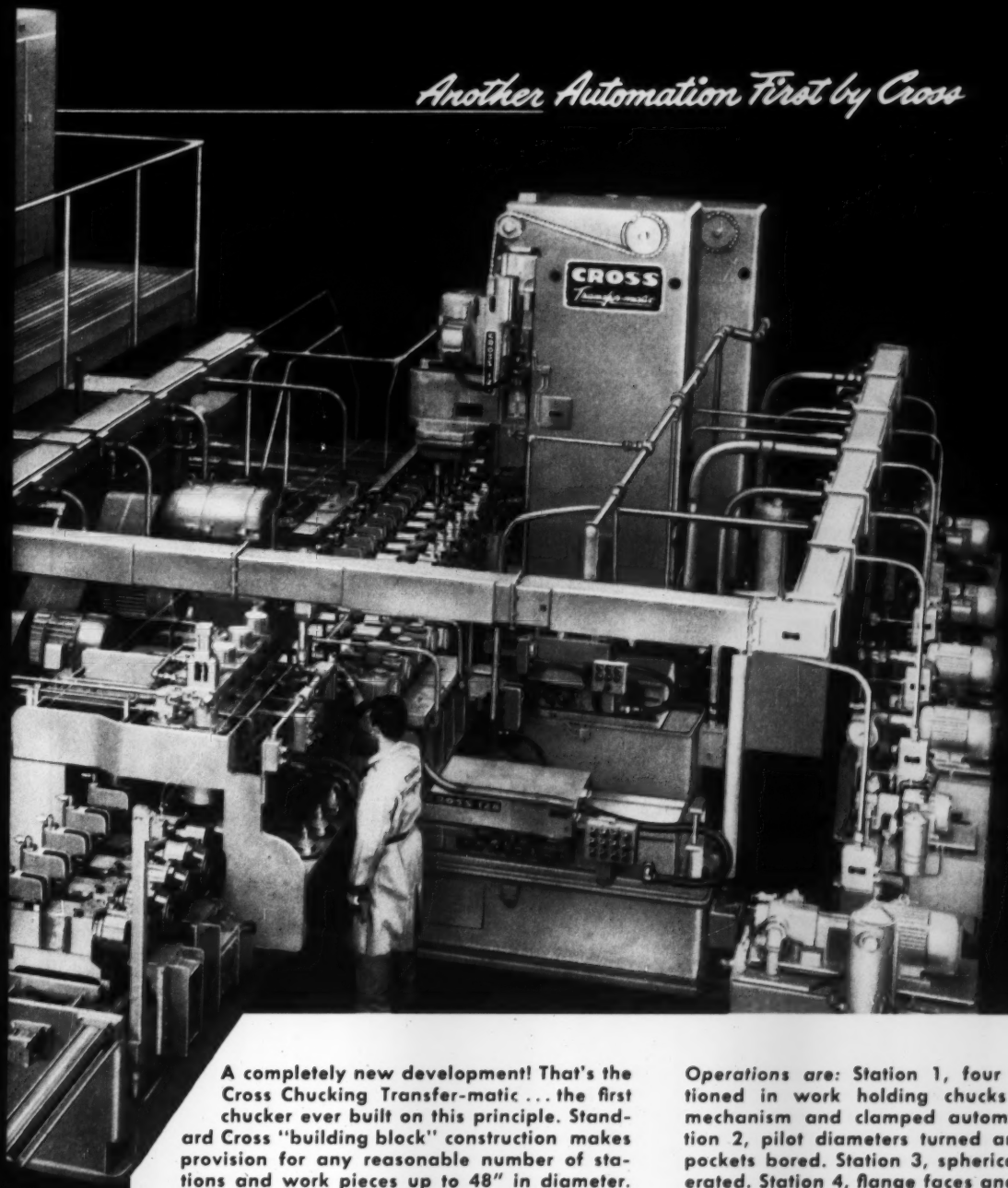
Announcing the NEW Cross Chucking Transfer-matic



Station 1

Station 4

Another Automation First by Cross



A completely new development! That's the Cross Chucking Transfer-matic . . . the first chucker ever built on this principle. Standard Cross "building block" construction makes provision for any reasonable number of stations and work pieces up to 48" in diameter.

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Features include construction to JIC Standards, hardened and ground ways, interchangeability of all parts, pre-set tooling and programmed tool changes with the Cross Machine Control Unit.

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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

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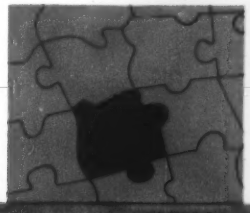

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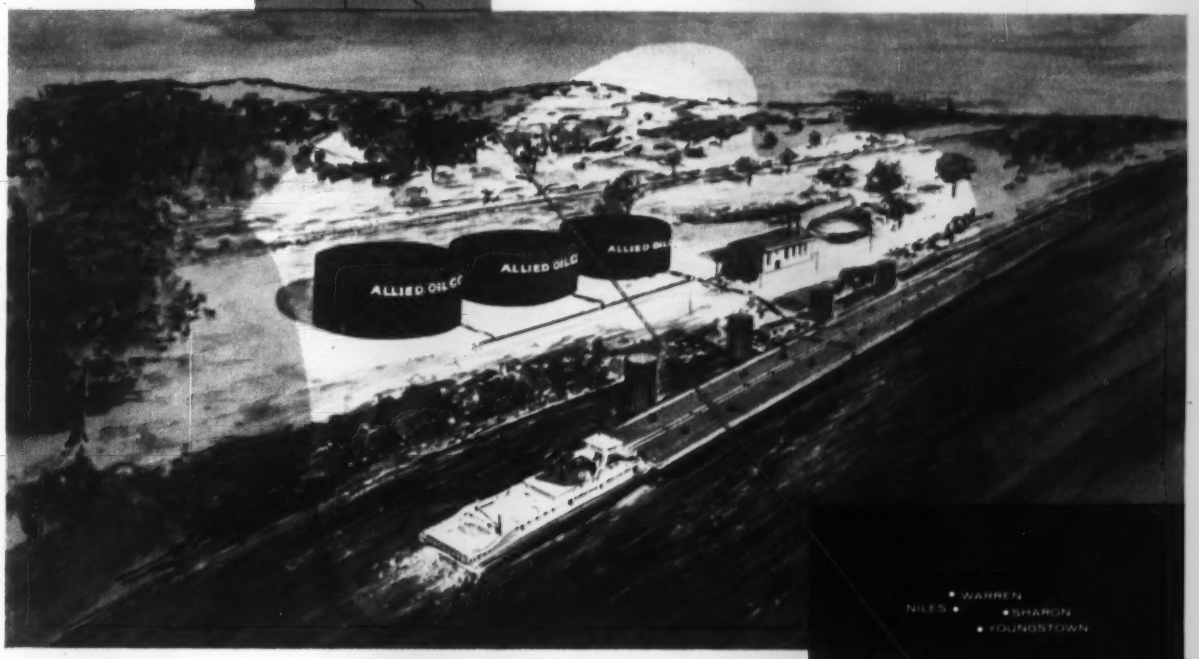

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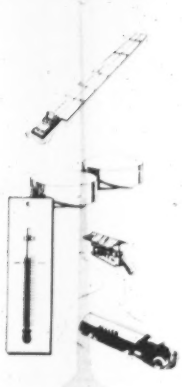

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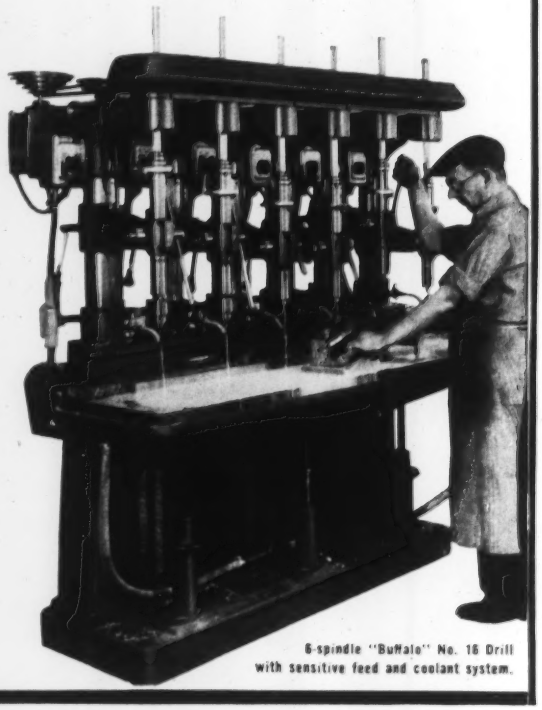

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"Buffalo"

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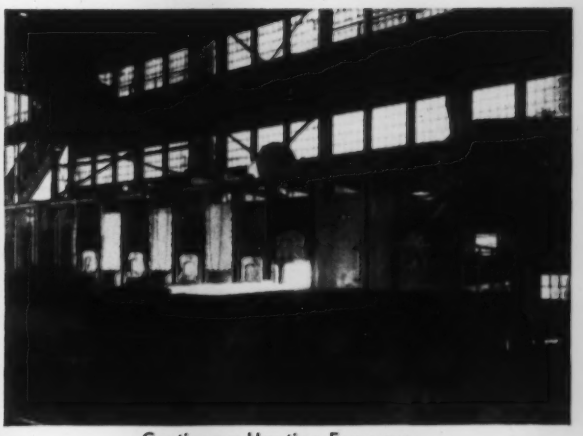
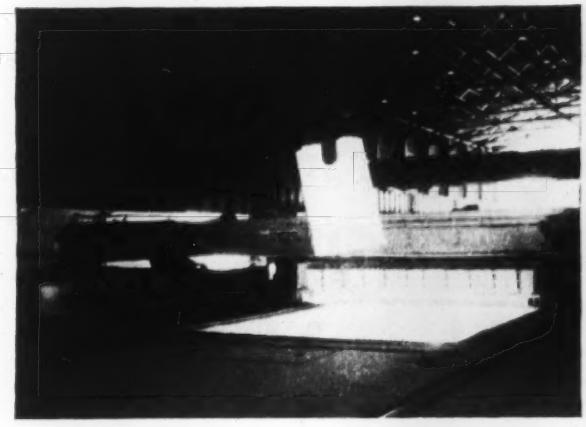
Open Hearth Furnaces—Photo Courtesy
Jones & Laughlin Steel Corp.



Continuous Heating Furnaces—
Photo Courtesy Crucible Steel Co.

Soaking Pit—Photo Courtesy
United States Steel Corp.



Heat Treating Furnace—
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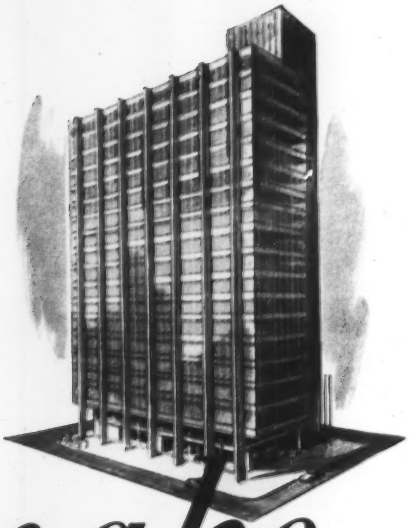

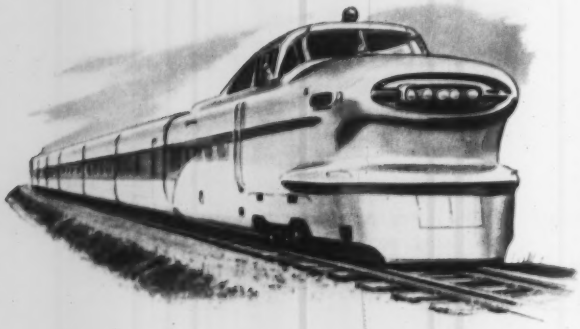

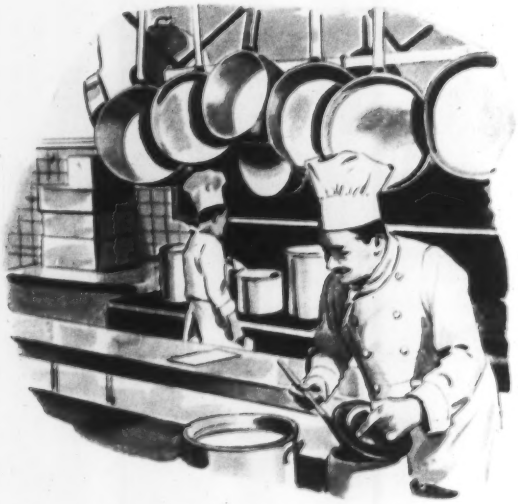

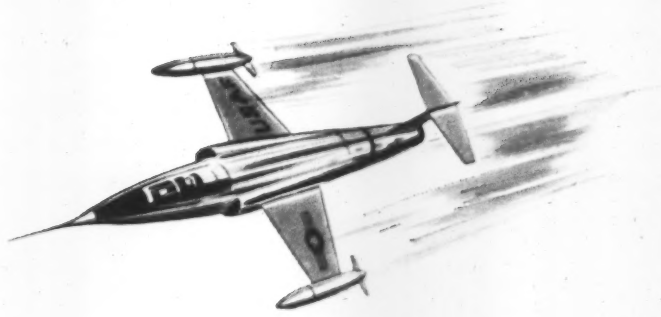

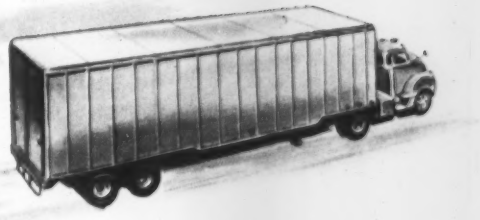

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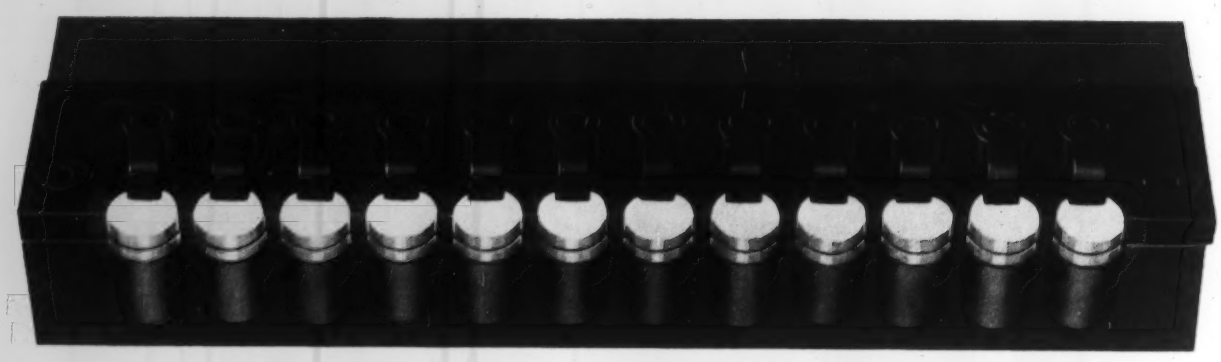


Kendex* multiple grooving tool, with 12 Kennametal "turnover" button inserts, and shims of Kennametal for fast groove cutting and rapid, accurate indexing

KENNAMETAL* Tooling for Special Jobs

Kendex principle is adaptable to a wide variety of job requirements

Many machining jobs often can be done better, faster, or at less cost with a new cutting tool . . . or a tool that is adapted to the existing conditions. The photographs illustrate this point, showing Kendex* Tooling re-designed for specific jobs.

Experienced Kennametal engineers will work with you to find the best approach to your metal-cutting problems. Often a modified standard tool is the answer, and your Kennametal tool engineer will recommend it. Sometimes an entirely new approach with specialized tooling may be the only solution to improve production. In either case, the chances are that Kennametal's experience during the last 18 years has solved a similar problem. Result: Time is saved . . . development work is reduced to a minimum . . . the basic design has been proven.

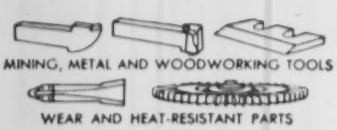
If you have a stubborn, high-cost production job, perhaps your Kennametal tool engineer can quickly suggest a solution. He devotes his time exclusively to tooling problems with one objective —to get the right tool and right grade of Kennametal on the job. His broad experience in tool design and tool application is supplemented by that of our Research and Engineering staffs. All are constantly at work to provide the best tools and most practical techniques for metal-cutting and forming operations. Call your Kennametal Representative or write to KENNAMETAL INC., Latrobe, Pa.

Boring bar utilizing Kendex clamped-holder principle and Kennametal triangular inserts of the "turn-over" throw-away type . . . eliminates grinding . . . reduces downtime.

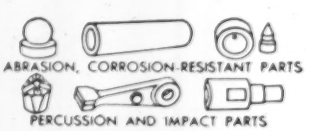
Facing and chamfering completed in one pass with a two-in-one Kendex Tool and Kennametal inserts. Another advantage: Since only the middle of chamfering insert is used, the two inserts may be interchanged after use, thus doubling the number of cutting edges for both operations.

*Trademarks

B-11.404



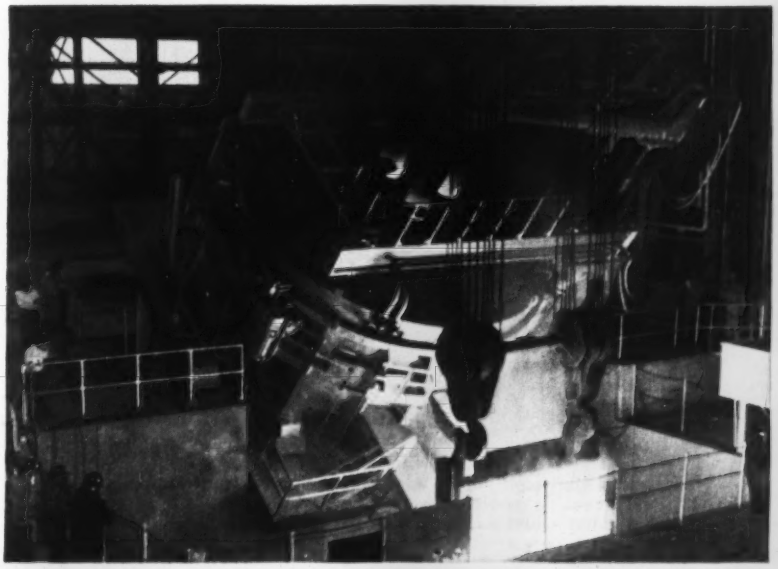
INDUSTRY AND KENNAMETAL ...Partners in Progress

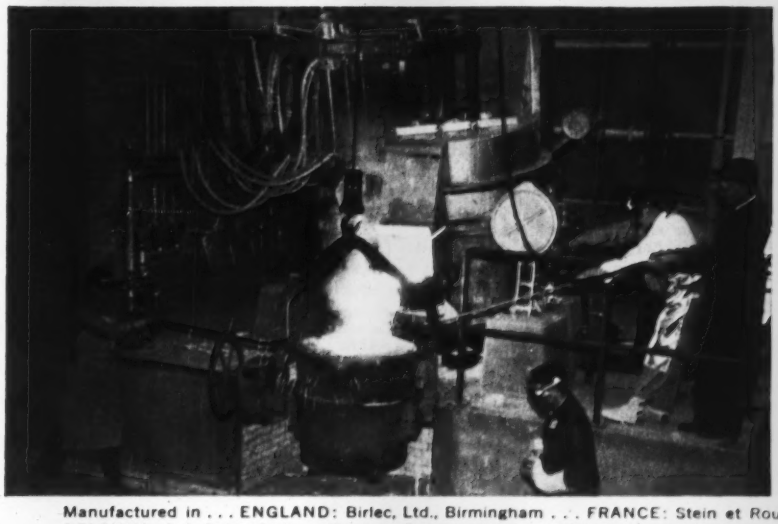


evolutionary

is the word that best describes

LECTROMELT* FURNACES





● Lectromelt's revolutionary announcements were made years ago, when these developments were first introduced by Lectromelt to the metallurgical industry:

Top charging for smooth, fast turnaround in electric furnace operation. There's less downtime between heats and less heat loss. Linings and the electrodes last longer.

Power input boosted tremendously, doubling the day's output. Lectromelt construction was heavied up, larger transformers and leads provided, more efficient cooling added.

Micro-accurate electrode control was combined with counterbalanced arms, greatly increasing the exactness to which analyses could be held. Supervisory labor was thus made much less burdensome.

Why label as revolutionary the things that have long been standard on Lectromelt Furnaces? The same bold thinking—evolutionary thinking—has been constantly applied to Lectromelt Furnaces and Equipment to maintain the leadership established many years ago.

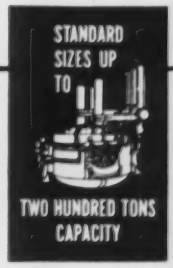
Catalog 9-B describes Lectromelt Furnaces. For a copy, write Lectromelt Furnace Company, 323 32nd Street, Pittsburgh 30, Pennsylvania (a McGraw Electric Company Division).

On research and on production, Lectromelt Furnaces provide the precision of control so necessary to the steelmaker.

Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa . . . JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... *Lectromelt*



7 Big Advantages!

in this

This 113' pre-enameling machine has dry cycling four days after delivery. Capacity 100-180 lb. racks per hour. Overall height of lift only 13'.

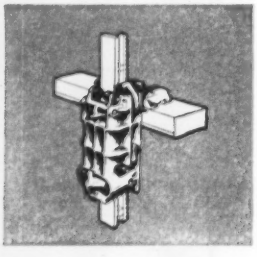
WAGNER PRECISION AUTOMATIC

- INCREASED LOAD CAPACITY
- PRACTICAL FLEXIBILITY
- LOWER PRODUCTION COSTS
- REDUCED MAINTENANCE
- 100% USER ADJUSTABILITY
- SIMPLIFIED INSTALLATION
- IMPROVED PLATING QUALITY

This modular precision electroplating machine is a big subject. Please send for our technical bulletin, learn all the facts, compare—or call the Wagner Man in your area. He'll study your problems and help you achieve better plating at lower costs.

Any day of the week you'll see us lift a 3200 pound automobile with the elevating mechanism of our standard automatic plating machine. That's just to dramatize the dynamic lift capacity of our modular type machine. This excessive capacity simply means that deflection under normal loads is minimum, thus strain on alignment mechanisms is eliminated, wear and downtime is reduced to the vanishing point. Your own personnel—any mechanic—can make precision adjustments of critical transfer members, including the main lift boom, carrier lift angle assemblies and carrier rail support brackets. Maintenance is simple as standard gear racks and pinions are used throughout the entire elevator mechanism (altho capacity can be increased 50% by substituting our heavy duty rack). Hardened guide rollers have positive lubrication—or central lubrication may be installed at low cost.

Here's how you get low cost installation and servicing, even later alterations. All details are interchangeable, precision drilled and machined, preassembled. Our modular design permits easy lengthening or shortening for long term production changes; parts, assemblies, even sections may be replaced. Every part is drilled, reamed, tapped and milled in special co-ordinated fixtures; sections are assembled in giant jigs for fool-proof self-aligning. A single hydraulic power unit interconnected to two hydromotors with micro adjustment of acceleration and deceleration permits work carriers to be lifted, transferred and deposited gently without jarring or loss of parts.



Typical pre-assembled single station elevator housing ready for bolting through jig-drilled holes in main carriage. Note adjustable roller guide brackets.

433 MIDLAND AVE., DETROIT 3, MICHIGAN

CHICAGO • CINCINNATI • CLEVELAND • INDIANAPOLIS • NEW YORK • ROCHESTER • GRAND RAPIDS

Wagner BROTHERS INC.

CALENDAR
OF MEETINGS

Dec. 3-6, National Institute of Management Inc.: Program on work simplification for supervisors, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

Dec. 5-6, Aluminum Extruders Council: Annual meeting, Park Sheraton hotel, New York. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Dec. 5-7, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Electric furnace steel conference, Morrison hotel, Chicago. Institute's address: 29 W. 39th St., New York 18, N.Y. Secretary: Ernest Kirkendall.

Dec. 5-7, National Association of Manufacturers: Annual meeting and exhibit, Waldorf-Astoria, New York. Association's address: 2 E. 48th St., New York 17, N.Y. Secretary: Thomas M. Brennan.

Dec. 6-7, Illinois Institute of Technology: Cost control conference, IIT Commons Bldg., 3200 S. Wabash Ave., Chicago. Institute's address: 35 W. 33rd St., Chicago 16, Ill. Manager of public relations: Victor J. Danilov.

Dec. 9-12, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, Boston. Institute's address: 120 E. 41st St., New York 17, N.Y. Secretary: F. J. Van Antwerpen.

Dec. 10-11, Material Handling Institute Inc.: Annual meeting, Biltmore hotel, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

1957

Jan. 12, American Electroplaters Society: Winter meeting, Sheraton Penn hotel, Pittsburgh. Society's address: 445 Broad St., Newark 2, N.J. Secretary: John P. Nichols.

Jan. 13-16, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc and Fontainebleau hotels, Miami Beach, Fla. Institute's address: 1729 H St. N.W., Washington 6, D.C. Executive vice president: E. C. Barringer.

Jan. 14-18, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N.Y. Secretary: John A. C. Warner.

Jan. 16-18, American Management Association: International management conference, Roosevelt hotel, New York. Association's address: 1515 Broadway, New York 36, N.Y. Secretary: Andrew P. Donovan.

Jan. 16-17, Caster & Floor Truck Manufacturers Association: Winter meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: H. P. Dolan.

Jan. 17-18, Steel Plate Fabricators Association: Annual meeting, Palmer House hotel, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

Jan. 18, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

Jan. 19-23, Truck-Trailer Manufacturers Association: Annual meeting, Del Coronado hotel, Coronado, Calif. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Ozalid Streamliner 200

full-width whiteprinting

for just **$995.00!**

AT LAST—*economical printmaking in full 42-inch widths!* Here's the brand-new Ozalid Streamliner 200. This compact, low-cost table-model whiteprinter gives you solid production capacity . . . turns out a print in seconds.

It's perfect for the small office—priced low for any budget. And it's an ideal "stand-by" for the big printroom. Use it when other equipment is out of service. Use it for short run "rush" work—without costly interruptions of volume printmaking.

With all of these "plus" features:

- full 42-inch printmaking capacity
- compact design—only 22" high . . . 27" deep
- simple, easy-to-operate controls
- automatic stacking
- sharp, fully detailed prints

For all the facts on the Streamliner 200, call your local Ozalid representative, or write: Ozalid, Dept. P-12, Johnson City, N. Y.

OZALID®

First name in whiteprinting

A Division of General Aniline & Film Corporation. In Canada, Hughes Owens Company, Ltd., Montreal

still the winner

... and in high speed steels, nothing beats REX

The winner and still champion after fifty years is Crucible's REX high speed steel. *And now it's better than ever!* Recent improvements in manufacturing processes have given even higher quality and greater uniformity to every one of its properties.

Why not shop test the new REX yourself? Test it for size, structure, response to heat treatment, fine tool performance. Give it any test you wish. You'll see why it is today, as it has always been — *the standard by which all other high speed steels are compared.*

Ask for REX by name at your local Crucible warehouse. Or order it directly for prompt mill delivery. And for information on REX, and the other Crucible special purpose steels, send for the *Crucible Publication Catalog. Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

with FALK Steelflex Couplings

Ever since the first Falk Steelflex Coupling was designed and built, we have firmly held to these beliefs:

1. A coupling, to give fullest value, must do more than merely *connect* driving and driven machinery—it must *protect* the machinery and prolong its life.

2. A coupling, to be truly flexible, must overcome the effects of shock and vibration, as well as shaft misalignment.

Proof of the soundness of those beliefs is furnished by the record. More than one million Falk Steelflex Couplings have been used on every conceivable type of industrial application . . . giving trouble-free service, providing maximum protection to connected machinery.

* A single basic type—the famous Type F—fills 90% of all industrial application needs. It is versatile, efficient and economical. And—it is always available from factory, field or distributor stocks, in a wide range of sizes.

Write to Department 247 for engineering bulletin, including selection and dimension tables.

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

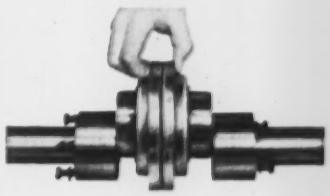
...a good name in industry

The New Type F Spacer Coupling

Here is a Steelflex coupling specially designed to permit fast, easy installation and removal in horizontal and vertical applications where it is impracticable to move the connected units—or where a space-gap (up to 12 in.) is necessary.

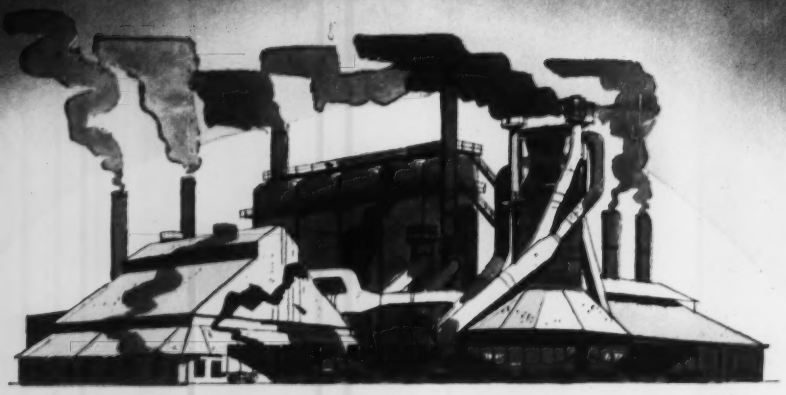
Like all Steelflex couplings, the Type F Spacer gives long, trouble-free service and maximum 3-way protection for connected machinery: it provides torsional resilience to reduce shock and vibration; it accommodates parallel or angular shaft misalignment; it allows free (or limited) end float.

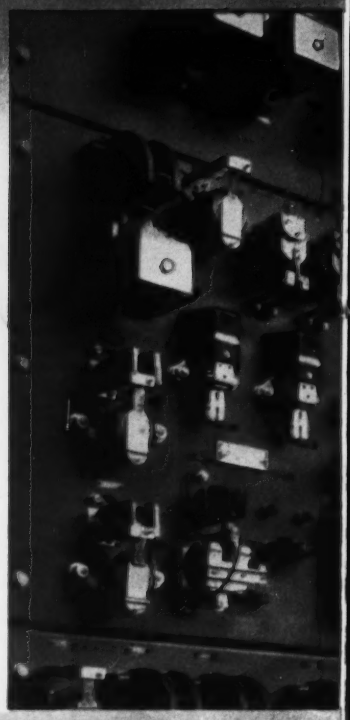
An outstanding feature of the Steelflex Spacer is that it can be installed or removed in one piece (see photo below); no dismantling or servicing of the coupling is required. Pump assemblies can be disconnected and removed without disassembling the coupling, without exposing working parts.



The Steelflex Spacer coupling is prelubricated at the Factory and can be installed, or removed and reinstalled, without disturbing the lubricant—a highly desirable feature.

expanding mill standardizes on





To meet ever-increasing demands for specialized steel, an eastern mill has completed an extensive expansion program consisting of a new reversing cold mill and two auxiliary lines. Significantly, Allis-Chalmers control is utilized in all three operations.

Progressive mills are taking advantage of Allis-Chalmers experience in engineering, building and applying steel mill control — control that provides smooth, precision performance — control that affords maximum production and top quality with a minimum of outage time and maintenance. Get all the facts about Allis-Chalmers mill control. See your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

PICKLING LINE

The Allis-Chalmers control on this line provides an exceptionally wide speed range of more than 15 to 1. Power for the line comes from three separate m-g sets employing magnetic amplifiers for quick response. Complete synchronization between entry, processing and delivery sections permits continuous mill operation.

ANNEALING LINE

This control features power-type magnetic amplifier regulation for accurate control and low maintenance. Variable voltage power is obtained from a six-machine m-g set. Speed regulation of .5% assures constant strip speed and a resulting uniformity of high quality steel. Open-type control boards utilize Allis-Chalmers components especially designed for mill operation.

ALLIS-

STEEL

REVERSING MILL

Critical percentage reduction of specialized steels rolled with this mill requires exacting control. Main mill voltage and reel tension circuits utilize new high-gain magnetic amplifier control. Because the magnetic amplifier is a static device, maintenance and necessity of replacement parts are reduced to a minimum. Fast arc-centering blowout on the dc contactors, shown on the control board, extends contact and chute life. Exceptional interchangeability of contactor and relay parts affords maximum convenience and economy.

A-C ALLIS-CHALMERS

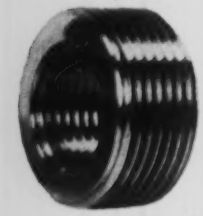
A-4971

CHALMERS

AT CANADIAN PRATT AND WHITNEY AIRCRAFT...

ALMCO barrel finishing SAVES 97% on deburring and finishing of spark plug bushings

CUTS DEBURRING AND FINISHING COSTS $2,430 — Threaded spark plug bushings used in famous Pratt & Whitney aircraft engines will be deburred and finished for $2,430 less this year with Almco equipment and processes. Maurice Harrison, Supervisor of Process Planning, shows the small part on which this savings will be made.



● **SAVES .10125 ON EACH BUSHING**—Deburring and finishing threaded spark plug bushings like the one shown at the left, formerly cost $104.20 per thousand when CP & W used speed lathes, portable power tools and other hand methods.

After installing two ALMCO DB-200 Supersheen units, records showed a cost cut of 97%. This equipment turns out 1,000 bushings in 45 minutes, releases grinders and finishers to other duties. Cost reports showed:

$104.20	cost per thousand with power tools.
2.95	cost per thousand with 2 ALMCO barrels.
$101.25	Savings per thousand pieces.

This year CP & W will process 24,000 spark plug bushings, *with a total savings of $2,430 on this one part alone.*

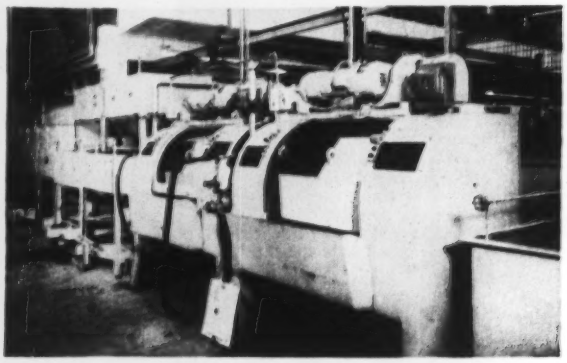
PRACTICALLY ELIMINATES REJECTS—Before installing controlled-type barrel finishing, parts inspectors returned for re-work an average of 125 bushings out of every 1,000 (12½%). With Almco Supersheen equipment and processes, these parts are now finished to a degree of uniformity that is virtually free of rejects.

DESIGNED FOR MANY METAL FINISHING OPERATIONS—In addition to deburring and finishing, ALMCO equipment and processes are used for descaling, degreasing, grinding, burnishing, work-hardening, rust-inhibiting, polishing, etc.

ALMCO has facilities throughout the United States for running sample parts. Write us on your letterhead for the address of an Almco sample processing laboratory or branch office in your area. Your sample, with your specifications, will be handled promptly. You'll get a complete report on where you can save deburring and finishing costs, how you can improve product quality and appearance, and what method and unit is best for your operation. Or, if you prefer, ask an Almco sales engineer to call you.

SEND FOR FREE 52-PAGE BOOK

Full of facts and processes on barrel finishing. Includes detailed cost chart on finishing of typical parts. Send for your copy today.



Two Model DB-200 Almco machines, using Supersheen bonded abrasive chips and compounds, deburr and polish 1,000 spark plug bushings in 45 minutes at Canadian Pratt and Whitney.

ALMCO

DIVISION OF QUEEN STOVE WORKS, INC.

1512 Marshall Street • Albert Lea, Minnesota

Sales and Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven, Philadelphia and London, England

"Weather" or not
There's no denying Stainless Quality
Boat designers long ago recognized the value of Stainless Steel for metal parts that must withstand the rigors of sun and salt. Sharon Stainless is without a peer when it comes to enduring beauty in seagoing hardware and trim, for it shrugs off salt spray without rusting, pitting or corroding. Like the automotive designers, water craft stylists are constantly using more and more Sharon Stainless Steel. Designers know, when they specify *Sharon Stainless*, they are assured of consistent quality, plus, the industry's finest finish.
SHARONSTEEL
Stainless Steel
SHARON STEEL CORPORATION Sharon, Pennsylvania
DISTRICT SALES OFFICES: Chicago, Cincinnati, Cleveland, Dayton, Detroit, Grand Rapids, Indianapolis, Los Angeles, Milwaukee, New York, Philadelphia, Rochester, San Francisco, Sharon, Seattle, Montreal, Que., Toronto, Ont.

This Cincinnati Bickford Super Service Radial Drill effects substantial cost savings in general applications. Drilling, tapping and setting fifty 1½" diameter studs on this turbo casing, shown above, is done in 185 minutes now as against 242 previously.

The York Corporation tells us that simplified, centralized controls, ease of machine positioning and minimum operator fatigue are important factors in these cost savings.

Write for bulletin covering these Cincinnati Bickford Super Service Radials.

Illustration courtesy of the York Corporation, York, Pa.

CINCINNATI BICKFORD

SUPER C B SERVICE

G&L

RADIAL AND UPRIGHT DRILLING MACHINES

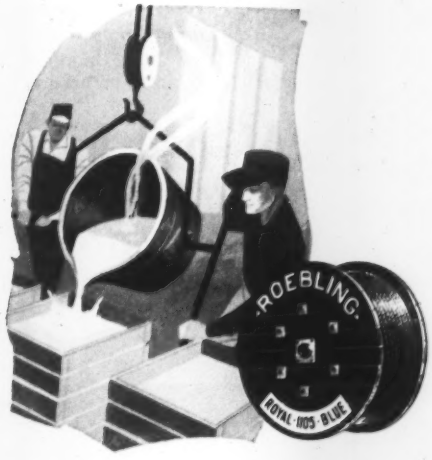
CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

faster

Royal Blue has won acceptance *faster* than any other wire rope in Roebling history



John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.

Lees-Bradner

Toro Manufacturing

hobbing...

Lees-Bradner Gear Hobbers produce the precision gears that go into much of America's automobiles, tractors and industrial equipment. Seven different sizes and types of Federal Ball Bearings are used in these intricate tools, smoothing the way for trouble-free operation.

or hobbying...

This 10-inch tilting-arbor Toro Power Saw is the answer to a do-it-yourselfer's dream. It will rip through a 2 x 4 like butter, or cut a delicately contoured molding. Federal Ball Bearings on the arbor keep the 10-inch blade humming sweetly.

so much of industry *turns* on FEDERAL ball bearings

It's no longer a question of *where* Federal Ball Bearings are used, but rather where *aren't* they used? Wherever you look – in home, office or industry, Federal Ball Bearings are doing their anti-friction job with quiet dependability. 12,000 sizes. Hundreds of types. Produced by a 50-year-old manufacturer of ball bearings exclusively.

When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make*?

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

New! Ball bearing and engineering data! *175 pages full in* FEDERAL'S CATALOG! *To get your copy, just write us.*

Federal Ball Bearings

One of America's Largest Ball Bearing Manufacturers

KEYSTONE XL WIRE STUDY

7 2/10 diameters...only 2 blows

KEYSTONE WIRE

gives uniform quality products at Midland Screw Corporation

flowability IS THE SECRET

Midland Screw Corporation, Chicago, Ill., threw the rule book out the window when they cold headed, in 2 blows, the welding screw shown here. That's the way this progressive firm tackles many problems. They've learned that they can make the difficult—or well-nigh impossible—jobs, easy when they use Keystone "XL" Cold Heading Wire.

It will pay you to investigate the possibility of using Keystone "XL" Cold Heading Wire in designs that have been considered too complex for ordinary wire. Talk over your problems with your Keystone Wire Specialist. He will show you how the *flowability* characteristics of Keystone "XL" Wire can help you, too!

Keystone Steel & Wire Company, Peoria 7, Illinois

Here are a few of Midland's products. Note that this includes the hex head Spin Lock bolt which has been produced for 3 years for the automotive industry from Keystone Wire without a single reject.

KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

Mail coupon for free booklet—COLD HEADING FACTS! Discusses methods, technical facts, wire requirements and other data.

Name _____ Title _____

Company _____

Street _____

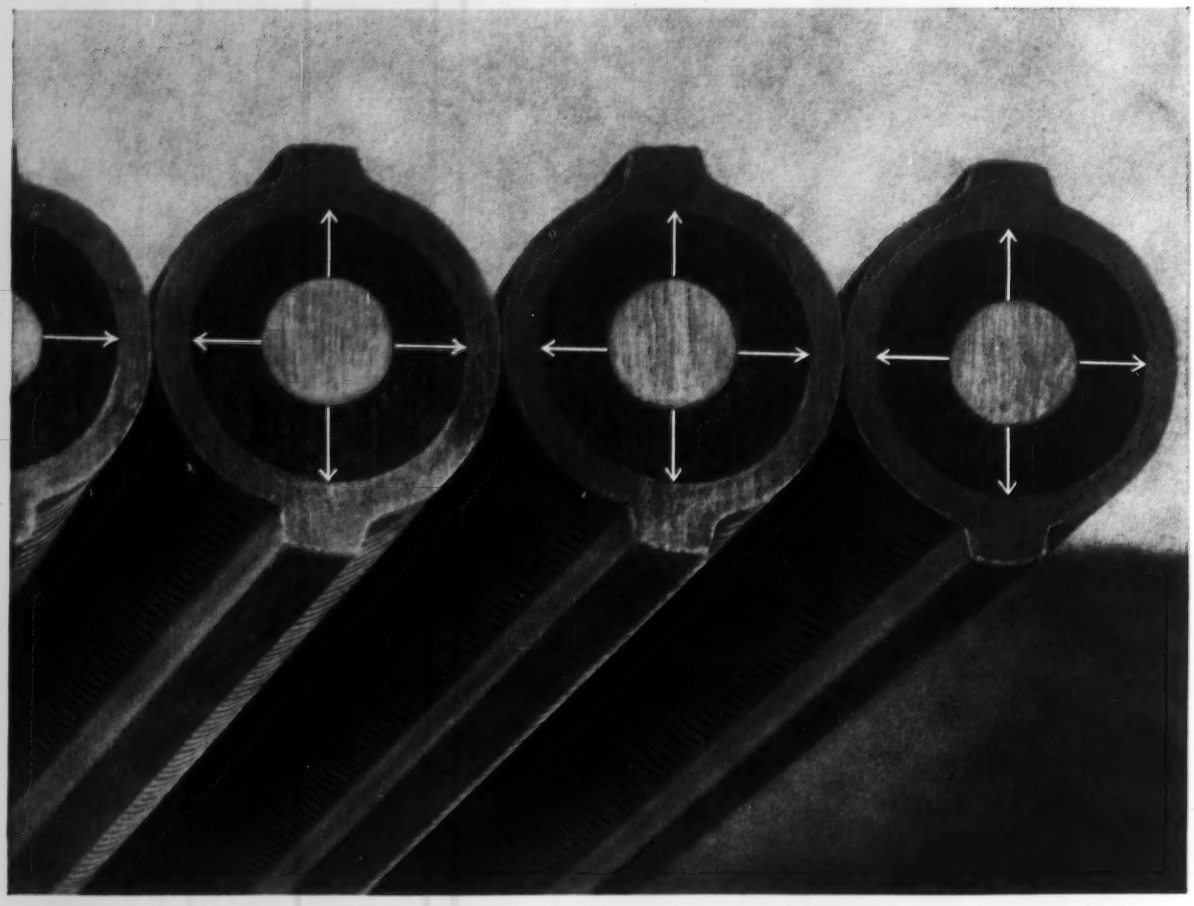
City _____ State _____

KEYSTONE

WIRE FOR INDUSTRY

EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation



Power tubes expand without shedding — preserve battery life

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

Every time you discharge a storage battery, the active material on the positive plates expands. But the plate grids don't expand. This is basic.

On most batteries, the expanding active material tends to shear off from the nonexpanding grid every time the action takes place. But this can't happen in the Exide-Ironclad Battery. The reason is simple.

Active material is formed concentrically around the spinelike grid and held inside the plastic tubes. Expansion is predominantly in an outward direction—hence no shearing. Active material remains firmly locked to the underlying grid structure. And the flexible plastic tubes yield and take up as needed.

This extra protection against shedding of active material is only one of the many reasons for the long life of Exide-Ironclad Batteries. When you order heavy duty batteries, or the equipment requiring them, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

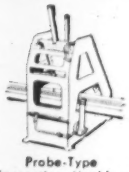
YOU GET A

Two-Fold

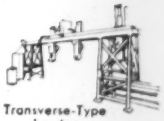
CREATIVE AUTOMATION SERVICE

AT

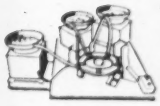
W. F. & JOHN BARNES



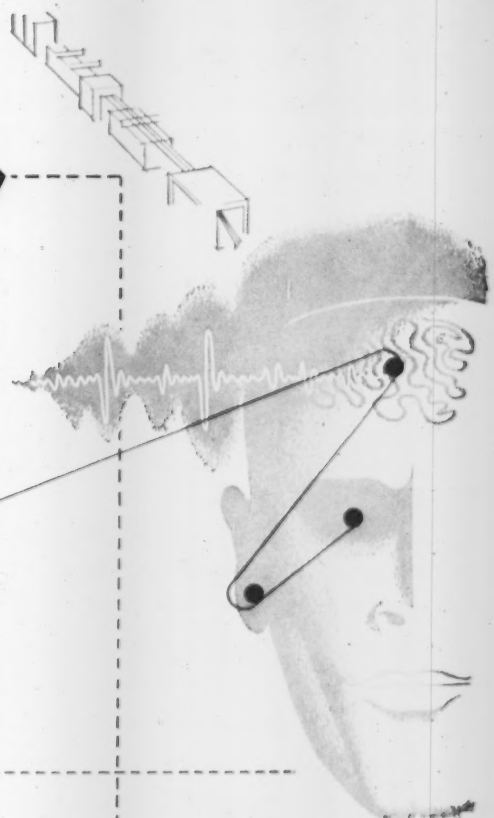
Probe-Type Inspection Machine



Transverse-Type Loader



Metal Fastener Assembly Equipment



Now to better serve your needs and help you solve automation problems quickly, Barnes offers a two-fold coordinated service.

COMPLETE PRODUCTION-LINE ENGINEERING

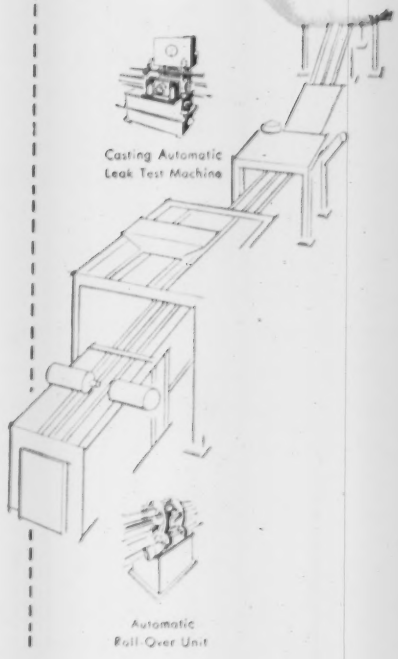
1 For new production line methods calling for either automatic or semi-automatic operations, you'll find at Barnes an experienced engineering staff to work with you. Detailed plans and proposals will be submitted for your consideration and can be depended upon to give you the latest in automation ideas and the very best of proven mechanical, hydraulic, and electrical actuation methods. Ask for a survey early in your planning program.

DESIGNING & BUILDING SPECIALIZED UNITS

2 The second and equally important part of Barnes two-fold service is the designing and building of specialized individual units to suit your specific needs. At Barnes you'll find a coordinated service where electrical, mechanical, hydraulic, fixture and tool engineers work together as a team. The combined efforts of a highly skilled and experienced engineering staff, coordinated with complete manufacturing facilities, help you save time by eliminating divided responsibility.

ASK FOR A METHODS ANALYSIS

Find out today why more and more Production Executives are turning to Barnes for a practical solution to their automation problems. We will be pleased to analyze your requirements, offer recommendations, and submit a cost estimate in a formal proposal if you so desire.



Casting Automatic Leak Test Machine

Automatic Roll-Over Unit

Builders of Better Machines and Equipment since 1872

W. F. & JOHN BARNES

AUTOMATION SECTION

432 S. WATER ST. • ROCKFORD, ILLINOIS

SPECIAL MULTIPLE SPINDLE MACHINE TOOLS • SPECIAL PROCESS EQUIPMENT • SPECIAL ELECTRICAL CONTROLS

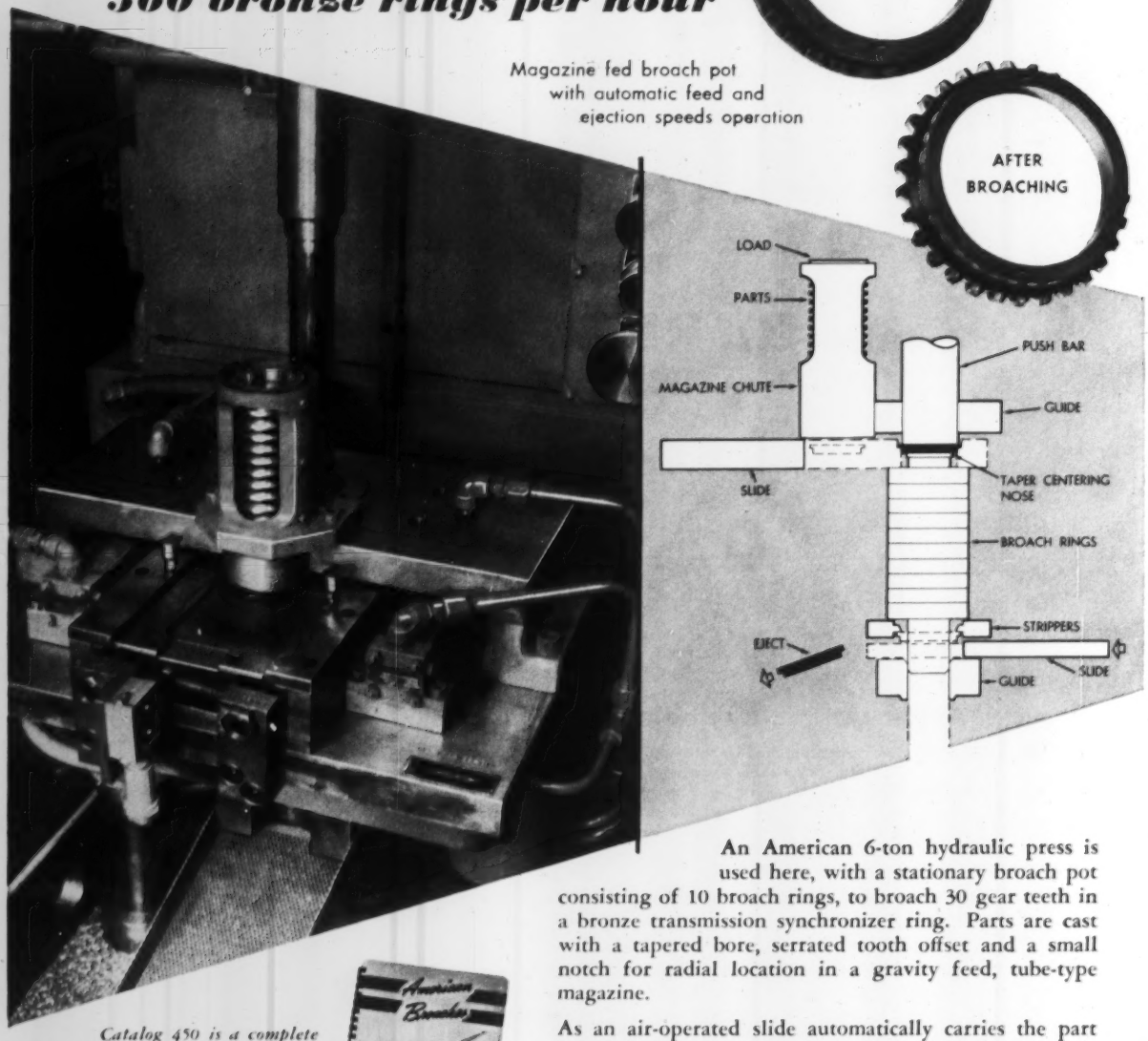
ANOTHER *American* FIRST

30 gear teeth broached

IN EACH OF

360 bronze rings per hour

Magazine fed broach pot with automatic feed and ejection speeds operation



An American 6-ton hydraulic press is used here, with a stationary broach pot consisting of 10 broach rings, to broach 30 gear teeth in a bronze transmission synchronizer ring. Parts are cast with a tapered bore, serrated tooth offset and a small notch for radial location in a gravity feed, tube-type magazine.

As an air-operated slide automatically carries the part into broaching position, the ram of the press descends and a push bar, engaging the tapered bore of the part, forces it through the broach pot. During the cutting operation the push bar is guided above and below the broach pot. Stripper fingers remove the part as the push bar returns. Ring is ejected by a second slide.

Catalog 450 is a complete and interesting manual on all types of broaching. Write for your copy today.

AMERICAN

American BROACH & MACHINE CO.

A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

SUNDSTRAND

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

Seven Products Replace Twelve. Sun representatives show how Sun's plan of industrial lubrication and preventive maintenance benefit management.

Over 70% of all plant equipment is now lubricated by only two moderately priced oils.

How A Sun Engineer Helped Cut Lubrication Costs by 15%... Reduce Oil Inventory by 42%

Maintenance Is Easier. Sun's plan helps prevent mistakes... reduces chances of applying wrong lubricant.

For years, department foremen of a large folding box plant purchased "special" lubricants to meet individual needs. Throughout the plant, a total of twelve products were being used...some extremely high in price.

The man from Sun called management's attention to this fact. He pointed out that much of the plant equipment, although different in name and function, was mechanically the same. He proved that over 70% of the equipment could be lubricated by two products instead of several lubricants basically alike.

Today, as a result of Sun's recommendations, "special" lubricants are gone; costs of lubrication are down 15%; and, oil inventories are reduced by 42%.

For the full story about how Sun can simplify lubrication setups and save on oil costs...see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-12.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

Announcement!

...Cleveland now offers a complete line of

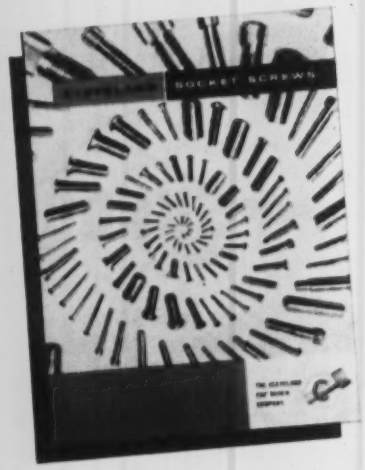
Top Quality Socket Screws

Our line of socket screws has been expanded to include all standard socket items, in all catalog sizes, made to Cleveland's extra high standards of quality.

- Socket Head Cap Screws
- Socket Set Screws
- Flat Head Socket Cap Screws
- Button Head Socket Cap Screws
- Shoulder Screws
- N.P.T.F. Pressure Plugs
- Socket Screw Keys
- Precision Dowel Pins

Complete stocks of Cleveland Socket Screw Products are available for immediate shipment.

Write or phone for this new Socket Line Folder



The Cleveland Cap Screw Company

2935 East 79th Street • Cleveland 4, Ohio • VUlcan 3-3700 TWX CV-42

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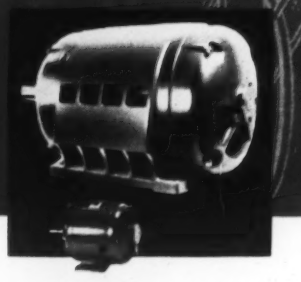
Why not build the cart before the horses?



Just tell us here at Master what you want in power drives—and get the utmost in flexibility, compactness and performance. It probably won't be as complicated as the multi-shaft Gearmotor illustrated here, with 14 shafts turning at diverse speeds. But, regardless of what you need, Master can supply the right combination of horsepower, shaft speed and mounting features with whatever Master components are required—all combined in one compact efficient unit. Just ask for information.

Motor Ratings. 1/8 to 400 H.P. All phases, voltages and frequencies.

Motor Types... Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

Construction .. Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

Speeds..... Single-speed, multi-speed, and variable speed.

Installation.... Horizontal or vertical, with or without flanges and other features.

Power Drive Features..... Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.

THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

Free booklet

Tells how new low cost Visual Communication System can improve your control and productivity

INTRA-TEL NEW GENERAL ELECTRIC CLOSED CIRCUIT TV

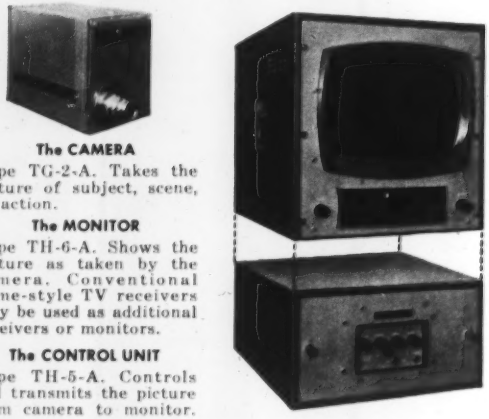
AVAILABLE NOW IN BLACK AND WHITE OR IN COLOR!

FOR modern management, instantaneous *visual communication* is a vital tool that pays its way in better control and increased productivity.

With the General Electric INTRA-TEL Closed Circuit Television System, you enjoy the full advantages of constant or immediate *visual* contact at new low cost. In most applications where distance, hazards, dust, and other limiting factors are present, you can *see* any number of remote locations at will, in black and white, or in color, as your needs require.

General Electric's new booklet – INTRA-TEL CLOSED CIRCUIT TELEVISION, is just off the press. Ask for a free copy, on your letterhead, please. It tells how easily you can have dependable General Electric INTRA-TEL TV working for you. The booklet answers your questions... contains scores of applications. Don't delay – write for your copy today. Please mention Booklet ECL-53 for black and white, or ECL-39A for color. *Industrial Electronics Division, Broadcast Equipment, Section X86126-3, General Electric Company, Syracuse, New York.*

The basic system is housed in three small, compact units... easy to place, easy to move!



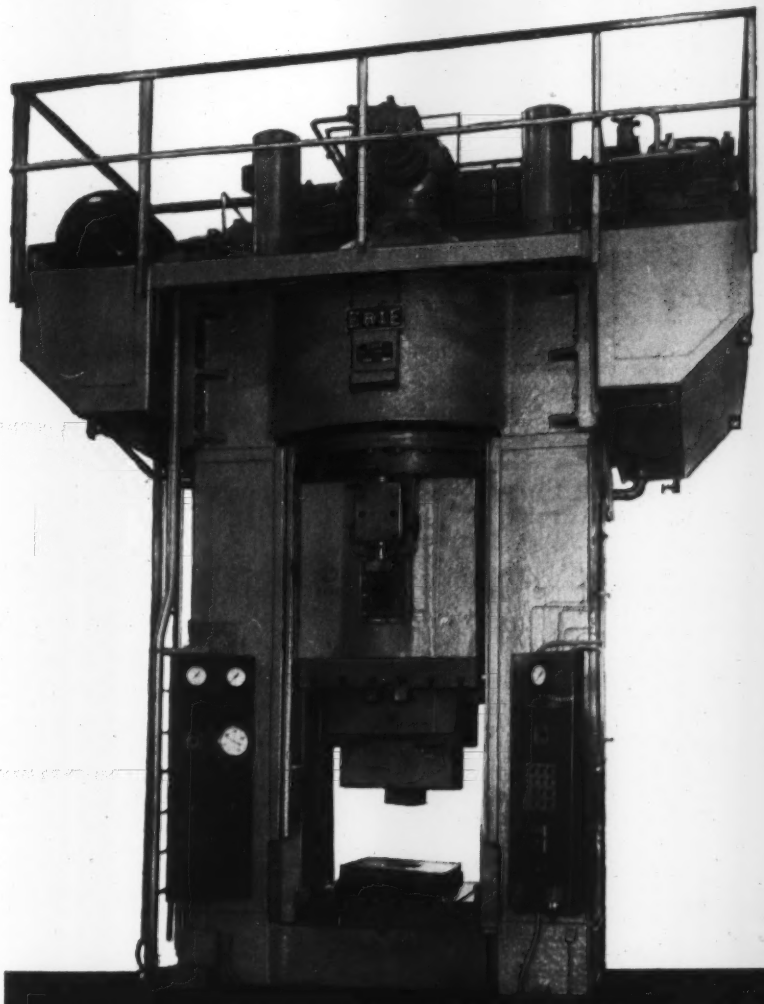
The CAMERA
Type TG-2-A. Takes the picture of subject, scene, or action.

The MONITOR
Type TH-6-A. Shows the picture as taken by the camera. Conventional home-style TV receivers may be used as additional receivers or monitors.

The CONTROL UNIT
Type TH-5-A. Controls and transmits the picture from camera to monitor.

Progress Is Our Most Important Product

GENERAL ELECTRIC



ELECTRO-MAGNETIC CONTROL

All controls are grouped on one accessible control panel which allows delicate finger-tip control by the operator . . . the machine responds *instantly*. This control allows any speed of ram travel in either direction.

SEMI-AUTOMATIC OPERATION

The forging cycle can be pre-set to incorporate any speed and tonnage—advance, press, slow return, fast return.

REMOTE MANUAL CONTROL

Manual control is easily detached from the control panel by the operator who is free to control the press from any nearby position.

HYDRAULIC TOP & BOTTOM STRIPPERS

Can be set to eject the forging from the die at *any* position.

NEW ADJUSTABLE GUIDES

Insure accurate platen alignment and *requires no shimming*. Adjustment can be made in less than an hour.

ERIE FOUNDRY'S NEW HYDRAULIC PRESS

with electro-magnetic control

produces precision forgings

1500-TON FORGING PRESS

platen size:	48" x 48"
opening:	60"
stroke:	48"
speeds—advance:	400" per minute
press:	adjustable from 0" to 52" per minute
slow return:	adjustable from 0" to 52" per minute
fast return:	360" per minute
hydraulic components:	Oilgear with Raytheon Servo-control

The Erie Foundry Hydraulic Forging Press was specially designed for no-draft non-ferrous forging. Modifications of this rigidly built, self-contained machine can be supplied to your forging requirements. For more information, please write.

ERIE

Hydraulic Press Division

ERIE FOUNDRY CO.

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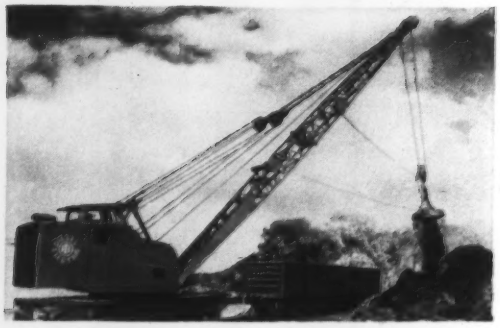
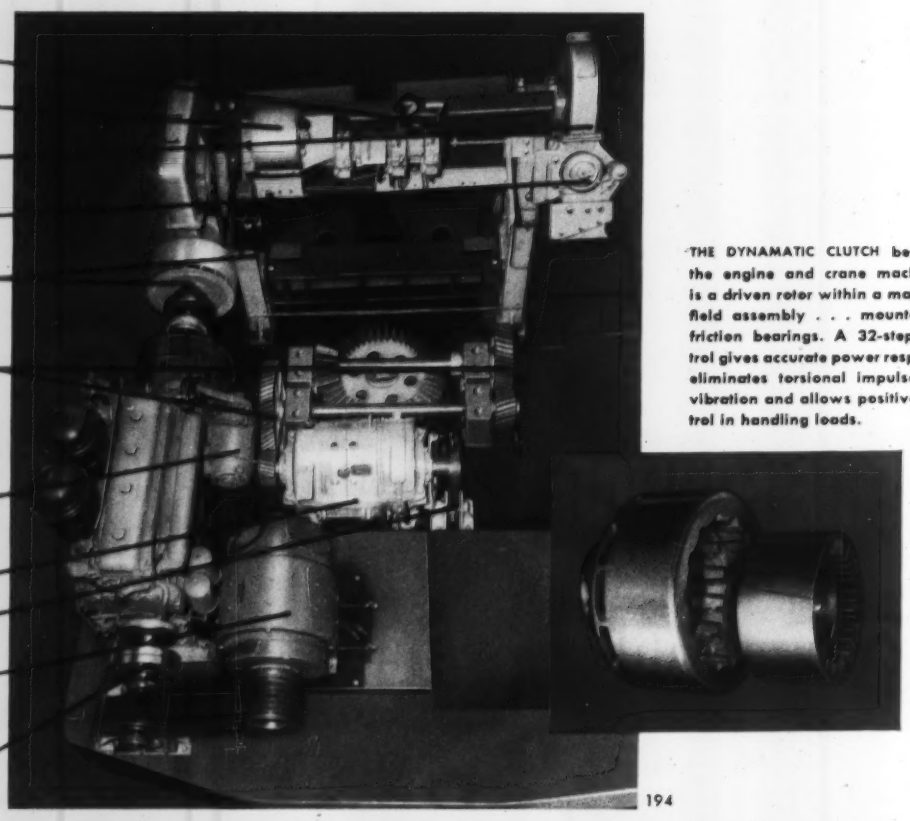
GREATEST NAME IN FORGING MACHINERY SINCE 1895

HOW THE ELECTRIC ROTATING MECHANISM IN I. B. LOCOMOTIVE CRANES increases operating speed and efficiency



Wherever crane rotation is unusually severe (magnet and bucket operations), an electric rotation unit (optional at extra cost) can be supplied with Industrial Brownhoist Cranes. The savings in maintenance and the greater efficiency plus the elimination of friction clutches offset the cost in a short time. The generator in the electric rotating motor is large enough to supply power for magnet service, and the complete rotation mechanism is easily accessible, being mounted on the top of the rotation bed. Reversing the flow of current through the motor, quickly and smoothly reverses the direction of rotation. • The carbody, trucks, monitor-type cab, and machinery arrangement of I. B. equipment have been equally well engineered. Write for Catalog No. 548 for complete information.

- PUSH BUTTON MAGNET CONTROL
- ROTATING CONTROLLER
- SAFE WORM DRIVEN BOOM HOIST
- AUTOMATIC BOOM HOIST BRAKE
- DYNAMIC CLUTCH AND CONTROLLER
- ELECTRIC ROTATION GEAR REDUCTION UNITS MOUNTED ON ANTI-FRICTION BEARINGS (HERE SHOWN WITH OIL CASES REMOVED)
- 1500-WATT BATTERY GENERATOR FOR STARTING AND NIGHT LIGHTING EQUIPMENT
- ROTATING MOTOR
- ROTATING BRAKE
- ROTATING AND MAGNET GENERATOR SUPPLIES CONSTANT VOLTAGE
- FLEXIBLE COUPLING



THE DYNAMATIC CLUTCH between the engine and crane machinery is a driven rotor within a magnetic field assembly . . . mounted on friction bearings. A 32-step control gives accurate power response, eliminates torsional impulse and vibration and allows positive control in handling loads.

194

BROWNHOIST

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

SUBSIDIARY OF Penn-Texas

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago; Montreal, Canada
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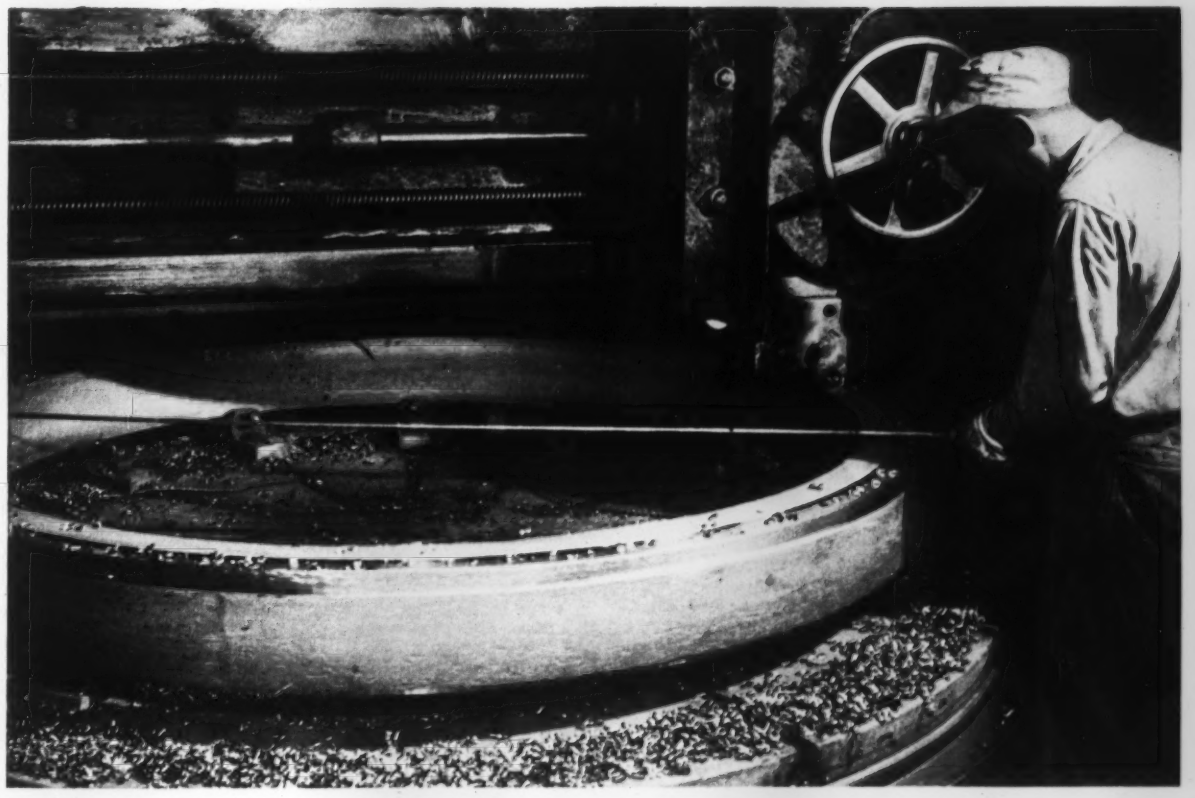

Here's proof of Hi-Qua-Led's performance in ALCO seamless forged and rolled rings:

"Roughing cuts reduced by ½
. . . cutter costs by ⅓
. . . running time by 12¼ hours
. . . surface finish: greatly improved"

Tremendous savings in machining time and reduced tool costs are reported by our ring customers who have used ALCO's new Hi-Qua-Led Steel*. Here's what one customer reports:

"The leaded steel machined successfully using half the normal number of roughing cuts and at greatly increased speeds. Surface finish was greatly improved. Normal surface finish on 4140 steel was from 80 to 125 rms, while surface finish on the two test gears was from 40 to 60 rms. Total running time per gear was reduced by 12.18 hours. Cutter costs were reduced by approximately one-third."

Make the comparison right in your own shop. Let ALCO furnish you a trial lot of Hi-Qua-Led steel rings along with your usual grade. See the advantages it brings in faster machining, with less power, reduced tool wear. Hi-Qua-Led may be obtained in any size ALCO forged ring. For complete information contact your nearest ALCO Sales Office.

*Trade-mark Reg. applied for. Patent applied for on lead-addition method.

Other customer tests of Hi-Qua-Led's machinability are equally impressive:

- **41L37 — Brinell Hardness 290-330**

  Turning — Speed increased from 2¾ rpm to 6 rpm. Depth cut: from ⅛ in to 3/16 in. Machining time improved: 69 per cent.

  Teeth-Cutting — Tool life increased 1600 per cent. Tool wear decreased 95 per cent.

- **41L40 — Brinell Hardness 285-302**

  Turning — Speed increased from 17 rpm to 25 rpm. Machining time improved 47 per cent.

  Teeth-Cutting — Tool life increased 427 per cent. Tool wear decreased 77 per cent. Machining time improved: 41.2 per cent.

Your copy of "Facts on Leaded Steel for Seamless Forged and Rolled Rings," is waiting for you. Just write ALCO Products, Inc., P. O. Box 1065, Schenectady 1, New York.

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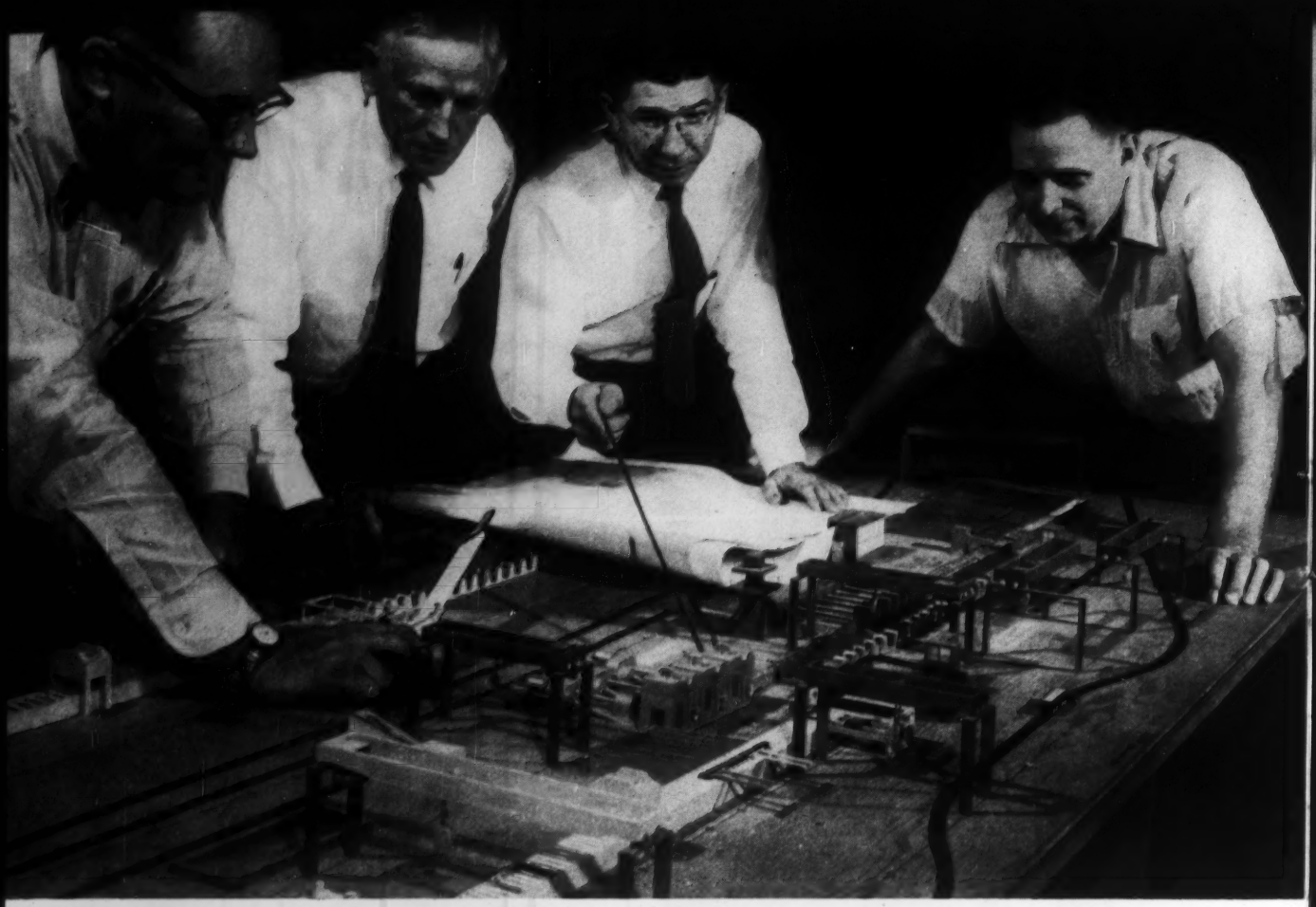
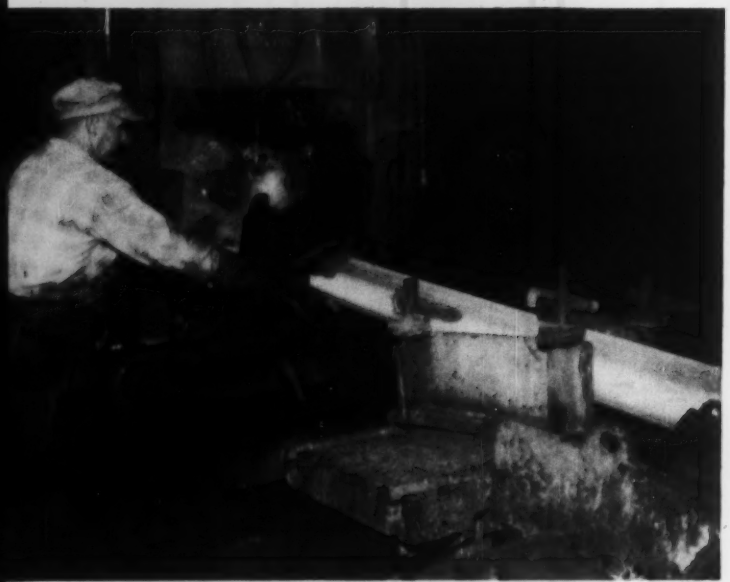


Pittsburgh Steel engineers huddle over scale model of new $6 million billet mill. It's part of . . .

Still More PROGRESS At Pittsburgh Steel



Glowing hot billets, or tube rounds like that pictured above, will emerge from the new billet mill in ever increasing quantities as a result of the current expansion program.

New Billet Mill Slated For Immediate Construction

Construction started December 1 on Pittsburgh Steel Company's newest expansion project—a $6 million billet mill which will rank with the finest of its type in the steel industry.

The new six-stand, continuous, 30-inch billet mill is scheduled for operation late next year. Besides increasing Pittsburgh Steel's capacity for making tube rounds and billets, the newest project will give further assurance of top quality steel.

The new mill—with three vertical and three horizontal mill stands in a straight line—will roll blooms from 9 x 10 inches down to 4-inch squares and 3⅝-inch rounds.

• **Fifth Project**—this latest project follows a four-phased $15-million dollar improvement program nearing completion. Thousands of Pittsburgh Steel customers have already begun to reap benefits in the form of wider product ranges and improved quality in Pittsburgh Steel's products.

(Advertisement)

New fabric machine was first project completed.

The four phases of the project are:

- Nineteen new by-product coke ovens which have increased coke producing capacity by 25 percent.
- Modernization of blast furnaces to give Pittsburgh Steel fully modern iron-making facilities.
- Installation of a new 96-inch wire fabric machine to greatly improve the mesh and fabric lines available.
- In addition, the enlargement and rebuilding of 12 open hearth furnaces is now more than 80 percent completed. This work will increase basic ingot capacity by 180,000 tons a year.

The entire program will be completed late in 1957 to give Pittsburgh Steel a 14 percent increase in basic capacity.

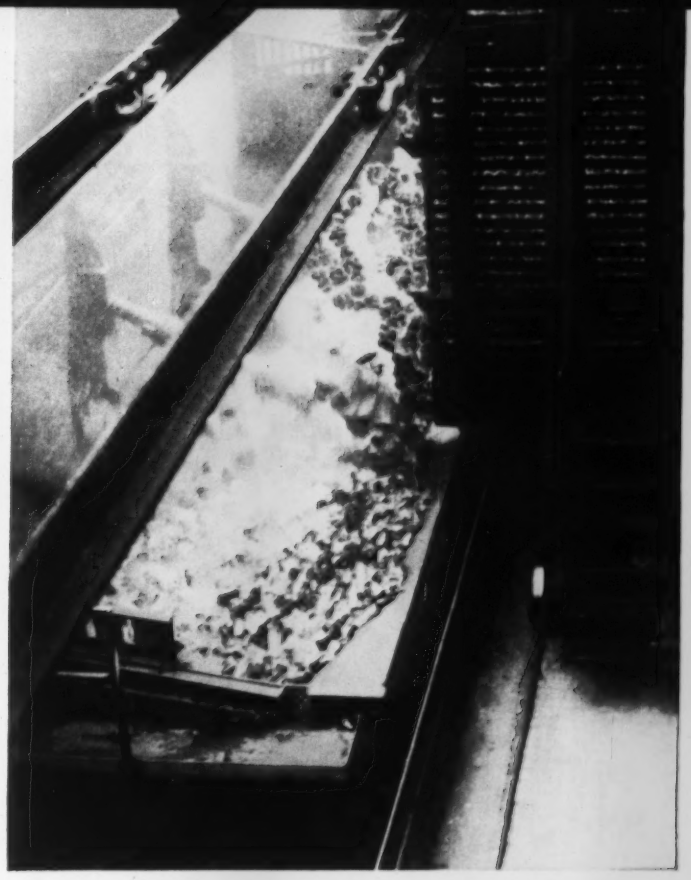
While the industry is expanding total capacity 11 percent in that three-year period, Pittsburgh Steel's 14 percent expansion will be completed in about a year and a half.

And the current program follows closely on a $65 million Program of Progress which made "a new company" of Pittsburgh Steel.

Keeping in the vanguard of this industry-wide move to give America the steel it needs has helped Pittsburgh Steel serve its customers with a wider range of steel products than has ever been available in the company's history.

Whether you need hot and cold rolled sheet and strip, coated or uncoated strip specialties, merchant trade goods, fine wire specialties, manufacturers wire, mechanical seamless tubing or oil country goods, Pittsburgh Steel offers you superior products and dependable service.

You can get in touch with a Pittsburgh Steel engineer by calling any district office. He's waiting to discuss your steel problems. Call today.



Nineteen new coke ovens already are in production.

Here's first steel from one of improved open hearth furnaces.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pennsylvania

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
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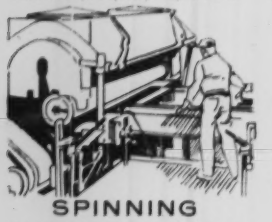
(Advertisement)

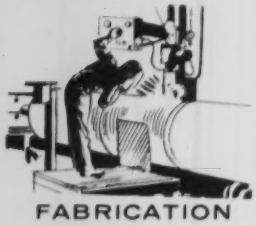
TECHNICAL ASSISTANCE

A staff of highly trained engineers, metallurgists, chemists and craftsmen serves the designer and manufacturer who specify Acipco spun tubes.



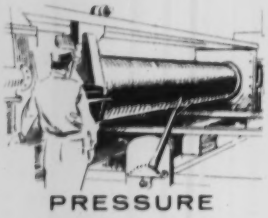
SPINNING

Acipco steel and iron tubes are centrifugally spun to exact physical and metallurgical specifications. The size and metal analysis your process or project requires is assured.



FABRICATION

Complete, integrated facilities for machining, welding, finishing, and heat treating of tubular parts save time and expense for Acipco customers.

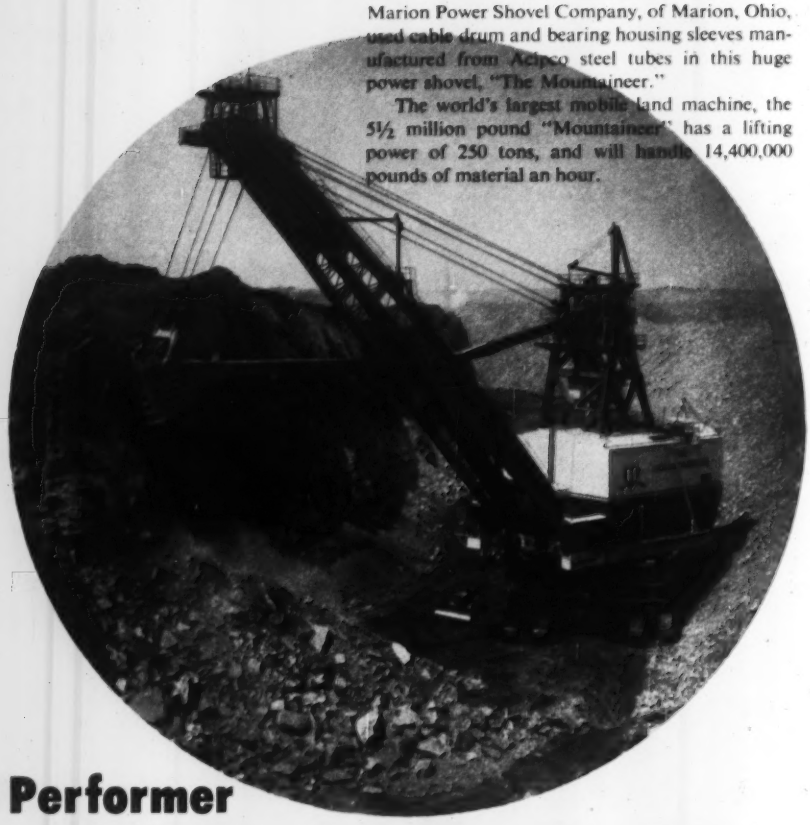


PRESSURE TESTING

Facilities for both hydrostatic and air testing, as well as for other physical and chemical analyses and tests, are available as part of complete Acipco steel tube service.

INSPECTION

Expert inspection by latest techniques, including radiography, if required, during all phases of production, helps keep Acipco steel tube quality high.



Marion Power Shovel Company, of Marion, Ohio, used cable drum and bearing housing sleeves manufactured from Acipco steel tubes in this huge power shovel, "The Mountaineer."

The world's largest mobile land machine, the 5½ million pound "Mountaineer" has a lifting power of 250 tons, and will handle 14,400,000 pounds of material an hour.

Big Performer

The ACIPCO

Centrifugally Spun Steel Tube

Whether your project is large or small, you can expect big performance from your application of Acipco spun tubes.

Because they are made to your exact specifications with the exact physical, metallurgical, and chemical properties your application requires, you can be sure from the start that Acipco steel tubes will be right for your job.

Get full information on Acipco centrifugally spun steel tubes. Acipco's combination of complete facilities, expert engineers, metallurgists, and craftsmen can serve your tubular steel needs, giving you unsurpassed steel tube performance with a big plus benefit of outstanding quality.

SIZE RANGE: Lengths up to 16′ — longer lengths by welding tubes together. OD's from 2.25″ to 50″; wall thicknesses from .25″ to 4″.

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

FURNISHED: As cast, rough machined, or finish machined, including honing.

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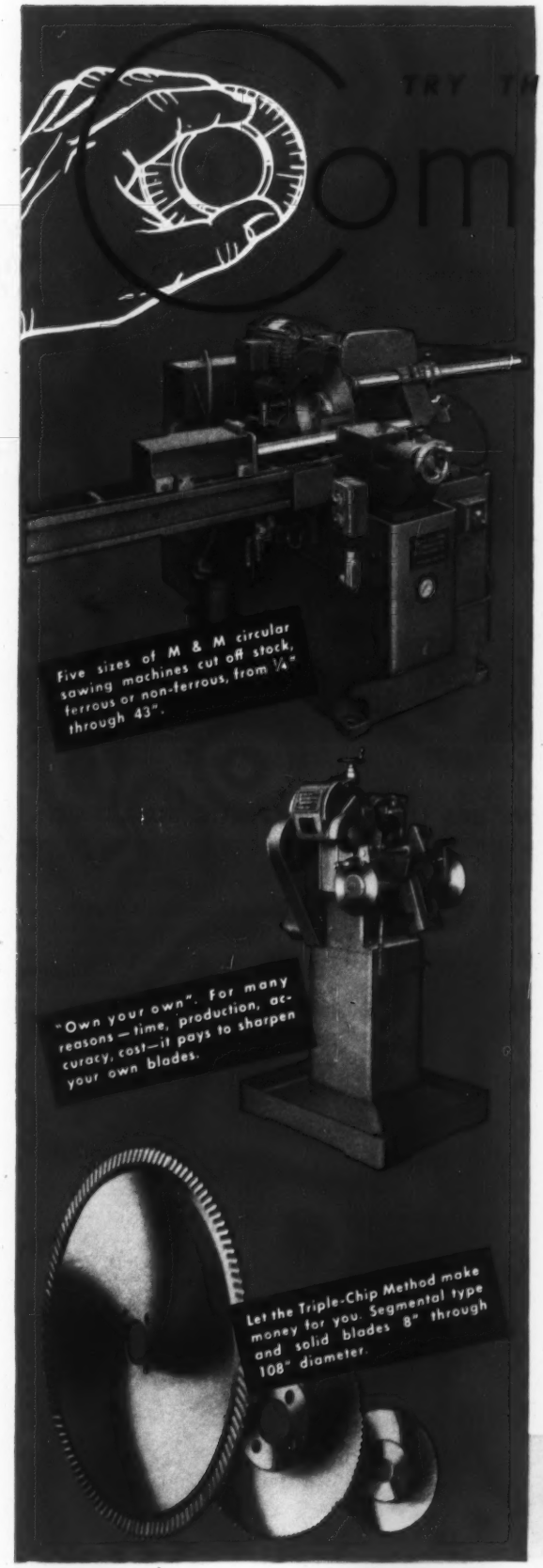
Special Products Division
BIRMINGHAM 2, ALABAMA


Five sizes of M & M circular sawing machines cut off stock, ferrous or non-ferrous, from ¼" through 43".
"Own your own". For many reasons—time, production, accuracy, cost—it pays to sharpen your own blades.
Let the Triple-Chip Method make money for you. Segmental type and solid blades 8" through 108" diameter.

TRY THE MOTCH & MERRYWEATHER

combination

TO HIGHER PRODUCTION, ACCURACY, PROFITS

M & M builds ALL 3 — CIRCULAR SAW • SAW BLADE • SAW BLADE SHARPENER

Get the most from your cut-off dollars. That means using the Motch & Merryweather circular sawing combination. There's no other way . . . With your own M & M automatic grinder you save days of time, save transportation and other expense, use blades longer, and control work quality . . . Let a Motch & Merryweather specialist demonstrate.

★ ★ ★

Ask for our NEW Circular Sawing Bulletin.

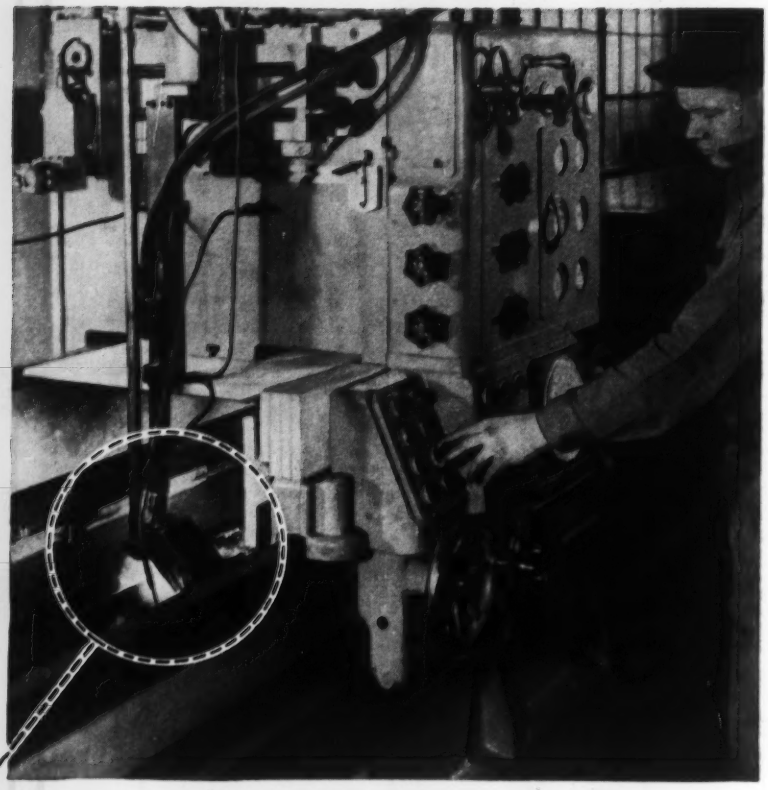
★ ★ ★

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION
CLEVELAND 13, OHIO

Builders of Automatic Precision Cut-Off, Milling and Special Machinery

HIGH SPEED FLAME-HARDENING



Cross-section view shows uniform depth of hardened surface.

SPECIAL MACHINE UPS LIFE OF GRAPHITIC STEEL PARTS

LINDE engineers have assisted Cincinnati Steel Treating Company in developing a flame hardening machine which increases service life of 16 ft. long, graphitic carbon steel lathe ways . . . Development of this automatic, high speed machine is another example of how LINDE Service Engineers are helping LINDE's customers up production speed and unit quality through co-operative research engineering.

With this new machine, a lathe way to be treated is placed on a magnetic chuck in a water filled channel. Flame-hardening heads and control mechanism move at predetermined speeds along the part. After it cools, the lathe way is placed in a refrigerator for 24 hours which stabilizes the steel, and brings its case hardness to a minimum of 60 Rockwell "C" scale.

The benefits of LINDE's research, engineering, and over 40 years of accumulated know-how stand behind each of its customers to help them solve production problems. Get these "plus-values" which LINDE offers—it pays you to do business with LINDE.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

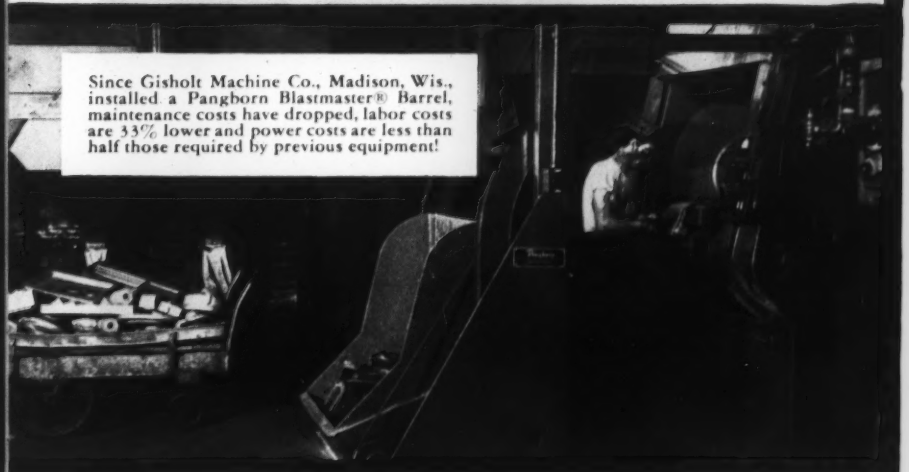
The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

A Pangborn Rotoblast Barrel and Table-Room at Florida Machine and Foundry Co., Jacksonville, Fla., have done a quality cleaning job, required no maintenance of any kind and "cut three shifts to one, cutting our total cleaning costs to less than half."

Pangborn Rotoblast® cuts cleaning costs more than 50% at Florida Machine and Foundry!

And cuts maintenance, labor and power costs at Gisholt!



Since Gisholt Machine Co., Madison, Wis., installed a Pangborn Blastmaster® Barrel, maintenance costs have dropped, labor costs are 33% lower and power costs are less than half those required by previous equipment!

The efficiency of a blast cleaning operation is determined by the cost *per ton of castings cleaned.* This overall figure incorporates many cost factors—labor, power, maintenance, speed, abrasive.

Pangborn Rotoblast cuts these costs! Pangborn Rotoblast cleans quickly and automatically . . . production goes up, power and labor costs go down. Pangborn Rotoblast boasts rugged construction and unique design . . . maintenance costs drop, downtime is reduced, abrasive loss is eliminated.

Total these savings and you'll find Pangborn Rotoblast gives you *lowest cost per ton of castings cleaned.* Choose the Pangborn machine best for *you* and slash operating costs!

Write today for Bulletin 227 to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn

BLAST CLEANS CHEAPER

Rotoblast Blastmaster® & Continuous-Flo Barrel

Rotoblast® Tables & Table-Rooms

Special Blast Rooms & Cabinets

Pangborn Dust Control Equipment

Distributors for Malleabrasive and Tru-Steel Abrasives

5-8

(Advertisement)

Fast, flexible GAS cuts heating cycle, ups production at Heppenstall Company

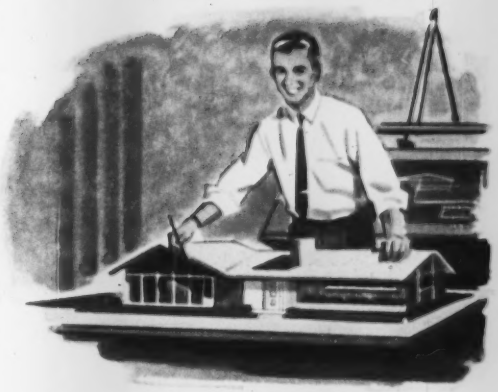
Heating die blocks for hardening is no longer a 20- to 30-hour operation at Heppenstall Company's Pittsburgh plant. A new, completely automatic program control heating method, with a heating rate 4½ times faster than previously attained, reduces the cycle to only 3 to 4 hours for work loads up to 20 tons.

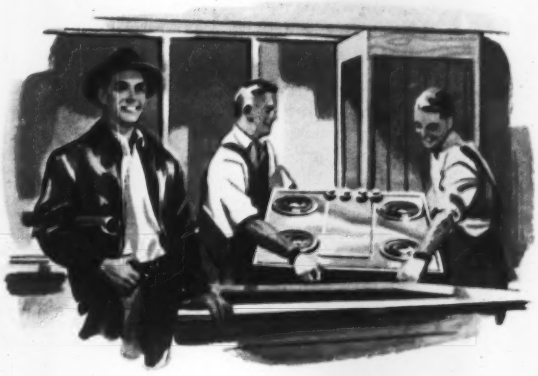
This fast heating is done with patterned radiant heat in a Gas-fired, car-bottom type furnace, designed and built by Selas Corporation of America. The furnace not only increases production rate four to five-fold —as compared with the 12 adjoining, conventional furnaces of approximately the same size—but also achieves this increase in output with 20 percent less fuel per pound of steel heated.

For information on how you can increase production by using Gas, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

in the home
everybody
benefits from

STAINLESS STEEL





THE ARCHITECT designs Stainless Steel into windows, kitchens, work surfaces, ovens and other important places because he knows there is nothing like Stainless for clean, lasting beauty.

THE BUILDER has had long experience with Stainless Steel. It's easy to install, does not chip or peel, and its beautiful finish presents no problem on matching or replacement.

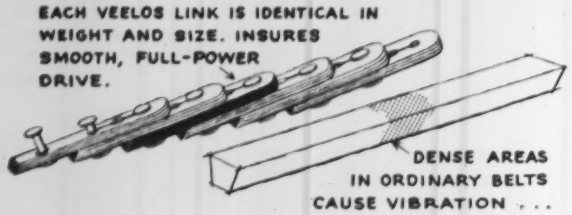
the owner likes living with Stainless Steel. It's always gleaming and beautiful, cleans with a wipe, and lasts forever. And, to complement her kitchen she loves to own those shiny pots, pans, tableware, and appliances, all made of Stainless Steel.

McLOUTH STAINLESS STEEL

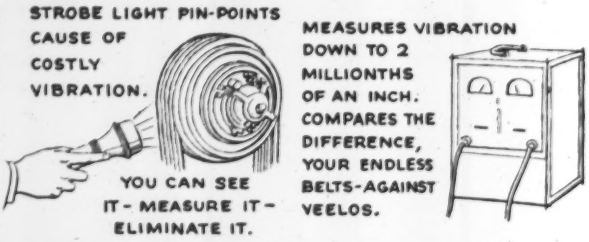
FOR THE PRODUCT YOU MAKE TODAY AND THE PRODUCT YOU PLAN FOR TOMORROW SPECIFY McLOUTH HIGH QUALITY SHEET AND STRIP STAINLESS STEEL

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN • MANUFACTURERS OF STAINLESS AND CARBON STEELS

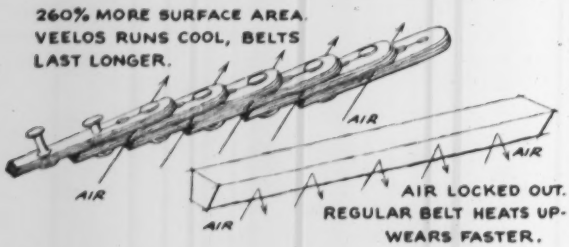
Six Reasons Why Veelos Adjustable V-Belts Are Better For Your Drives!


EACH VEELOS LINK IS IDENTICAL IN WEIGHT AND SIZE. INSURES SMOOTH, FULL-POWER DRIVE.
DENSE AREAS IN ORDINARY BELTS CAUSE VIBRATION . . . MACHINE WEAR

1. Balanced construction of Veelos Belts assures you faster, cleaner work, less rejects . . . less bearing wear. Each link and stud is identical in size and weight. Ordinary belts have varying spots of density which cause excess vibration—chatter marks, machine wear.


STROBE LIGHT PIN-POINTS CAUSE OF COSTLY VIBRATION.
YOU CAN SEE IT - MEASURE IT - ELIMINATE IT.
MEASURES VIBRATION DOWN TO 2 MILLIONTHS OF AN INCH. COMPARES THE DIFFERENCE, YOUR ENDLESS BELTS-AGAINST VEELOS.

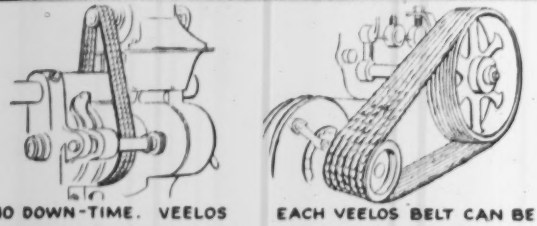
2. Electronic proof—up to 90% less vibration! With a vibration analyzer, you see, on your own machine, how Veelos belts decrease vibration up to 90% over any belt you're now using. This amazing Veelos test pin-points the belt that has the "invisible shakes."



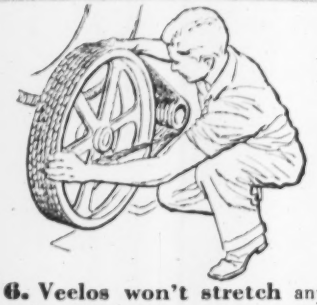
3. Cooler running—long life! Veelos breathes! Constant circulation of air keeps Veelos running smooth. Regular V-belts have no chance to cool, heat builds up from the inside . . . causes slippage, wastes power, heats bearings, reduces belt life.

AREA CONTACT
POINT CONTACT
PERFECT VEELOS FIT. EXTRA THICKNESS AND MACHINE-CUT SIDES PREVENT BOTTOMING. MEAN CONSTANT POWER.
POWERLESS POINT CONTACT OF ORDINARY V-BELT. BULGES, SLIPS, CAUSES UNEVEN SHEAVE WEAR.

4. Greater flexibility reduces slippage! Sectional construction, beveled links allow greater flexibility, longer belt life. Each link moves around sheave independently and maintains full contact, constantly. Full area contact allows shorter centers, smaller sheaves.


NO DOWN-TIME. VEELOS FITS ANY DRIVE - WITHOUT DISMANTLING.
EACH VEELOS BELT CAN BE ADJUSTED - NO NEED FOR EXPENSIVE MATCHED SETS.

5. Simple installation "knocks out" down-time! Saves up to 50% installation time on outboard bearing drives, more when belt length isn't in stock. No resetting, tilting or moving motors. Veelos can be made any length, can be changed by adding or removing links.



6. Veelos won't stretch any more than ordinary endless V-belts when it is properly installed. *Remember—measure Veelos 1" short per foot and roll on drive as tightly as possible.* With the first few revolutions Veelos studs accept a permanent set into the sections they connect.

4 TYPES—FOR ALL DRIVES

REGULAR For general service
OILPROOF For oily and hot drives
COATED For wet or oily drives
STATIC-CONDUCTING For explosive atmosphere

VEELOS THE BALANCED LINK V-BELT

Known as Veelink outside U.S.A.

For all sizes and types of drives. Double-V available for serpentine drives.

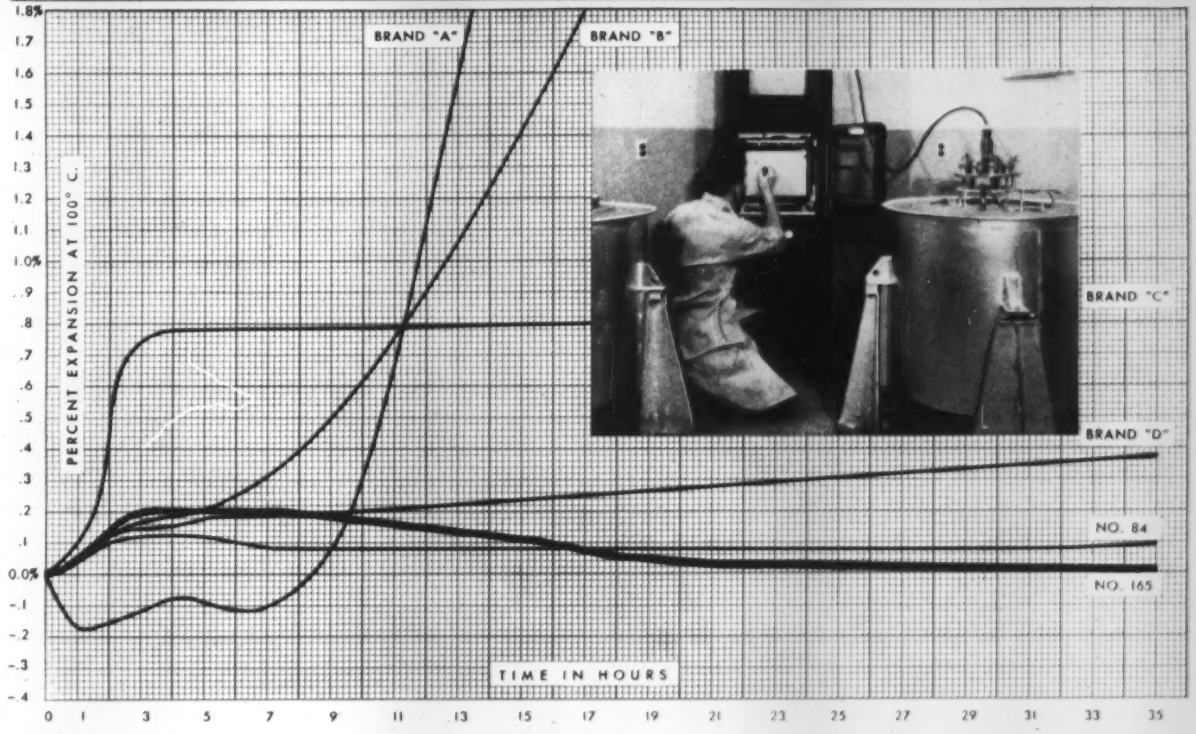
Write for free Veelos Data Book or Veelos Vibration Demonstration to:

MANHEIM
Manufacturing & Belting Co.
409 Stiegel St., Manheim, Pa.

"Industrial Belt Specialists Since 1911"

© M.M.&B. Co. 1956

"SOAK AND SWELL" CHART shows why Permanente 165 Ramming Mix gives longest-life furnace bottoms



HYDRATION—reaction with water—during the heat-up period usually causes swelling of rammed magnesia bottoms. Leading ceramic engineers believe that as little as 0.3% expansion indicates damaging hydration, shorter bottom life.

To measure these minute expansions, Kaiser Chemicals Research developed the sensitive electronic instrument shown above. This device, called a dilatometer, can accurately measure and record expansions of less than 0.01% and maintain a constant temperature within ±0.5°C.

Dilatometer Traces Charts

For the test charted above, equal size blocks freshly prepared from each of six well-known ramming mixes were placed in a common heating chamber and attached to the recorder.

The chamber was then heated to just below the boiling point of water with the atmosphere held at 100% relative humidity to create forced hydration conditions. Finally, the samples were allowed to soak for 35 hours to simulate hydration conditions which a mix may encounter in the deeper regions of a bottom.

As you can see in the chart, Permanente 165 shows virtually no signs of expansion ... proof that it resists hydration significantly better than any other ramming mix tested. (Permanente 84 Hot Patching Mix runs a very close second.)

Research Aids Bottom Performance

Permanente 165's outstanding resistance to hydration is an excellent example of how Kaiser Chemicals Research is working to give you furnace bottoms that last longer, need fewer repairs. Why not let your Kaiser Chemicals Sales Engineer provide research, design and installation assistance to help you take advantage of this superior ramming mix?

Call or write Kaiser Chemicals Division, Dept. R6221, Kaiser Aluminum & Chemical Sales, Inc., at any of the addresses listed below:

PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . 1924 Broadway

Kaiser Chemicals

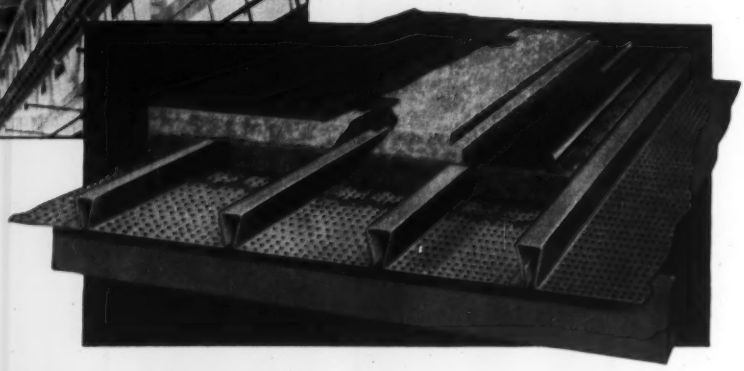
Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Castables & Mortars
Magnesite • Periclase • Deadburned Dolomite

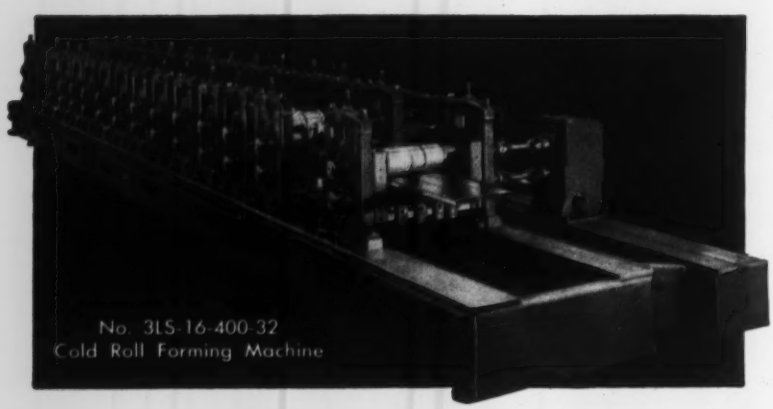
"...satisfactorily produced millions of feet of Holorib roofing", says Mr. N. E. Hubbell

Buffalo Plant Mgr.
Detroit Steel Products Company

"Since 1930 Kane & Roach machinery has satisfactorily produced millions of feet of Holorib roofing — a section which cannot be easily roll formed. When our production increased we called on K & R in 1946 to furnish additional equipment."



Shown above: Installation of Fenestra Acoustical Holorib Ceiling



No. 3LS-16-400-32
Cold Roll Forming Machine

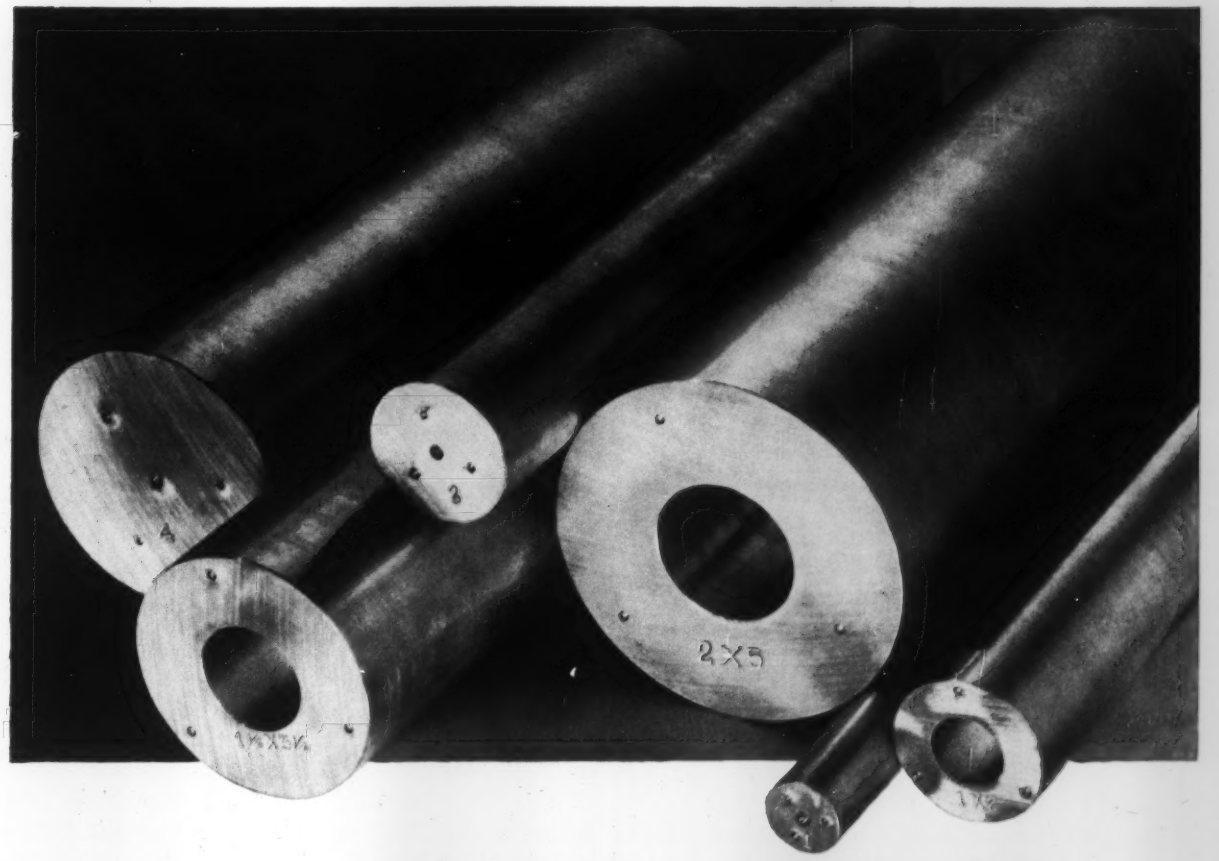
Millions of feet of easily-erected Fenestra roof ribbing have been handled rapidly and accurately on Kane & Roach machines. Nominally rolled from 18 gauge coiled stock the machine forms both plain and perforated sheets. A flying cut off is employed at the discharge end permitting continuous operation of machine in cutting lengths to meet customers' specifications.

Write or wire us today. Our production-tailored engineering can help you cut costs and up production in your plant.

Kane & Roach

INCORPORATED

SYRACUSE, NEW YORK • ESTABLISHED 1887



You get **Convenience** *and* **Quality** with Johnson Bronze Bars

For your convenience, Johnson Bronze solid and cored bars are now stamped on each end with the exact size. This makes it unnecessary to remove bars from bins to check the OD for size—helps prevent errors—makes for quick inventory. Also, bars of various sizes can be stored in one bin because the size is visible which saves storage space.

In addition, the ends of all Johnson bars are centered for ease and accuracy of machining. All the operator has to do is set the chuck on the indented marks, take a 1/64" cut and he has the size bar indicated. This speeds machining, assures concentric parts since the work is always in perfect alignment. Also, Johnson bars are in the convenient 13" length—are easy to store and handle.

The quality of Johnson bronze bars is rigidly controlled from heat to heat by frequent chemical analysis. These bars are produced in permanent molds or by centrifugal casting. Either method eliminates the possibility of sand inclusions—allowing maximum uniform density.

Johnson Bronze bars are available in over 400 stock sizes. They are used extensively for making bearings, washers, thrust plates, gears, pinions, guides, rollers, sheaves, trolley wheels and other parts for original equipment and maintenance. They are quickly available from your distributor. Ask him for a folder which lists the range of sizes of cored and solid bars or write Johnson Bronze Company, 550 S. Mill Street, New Castle, Pa.

Johnson Bearings

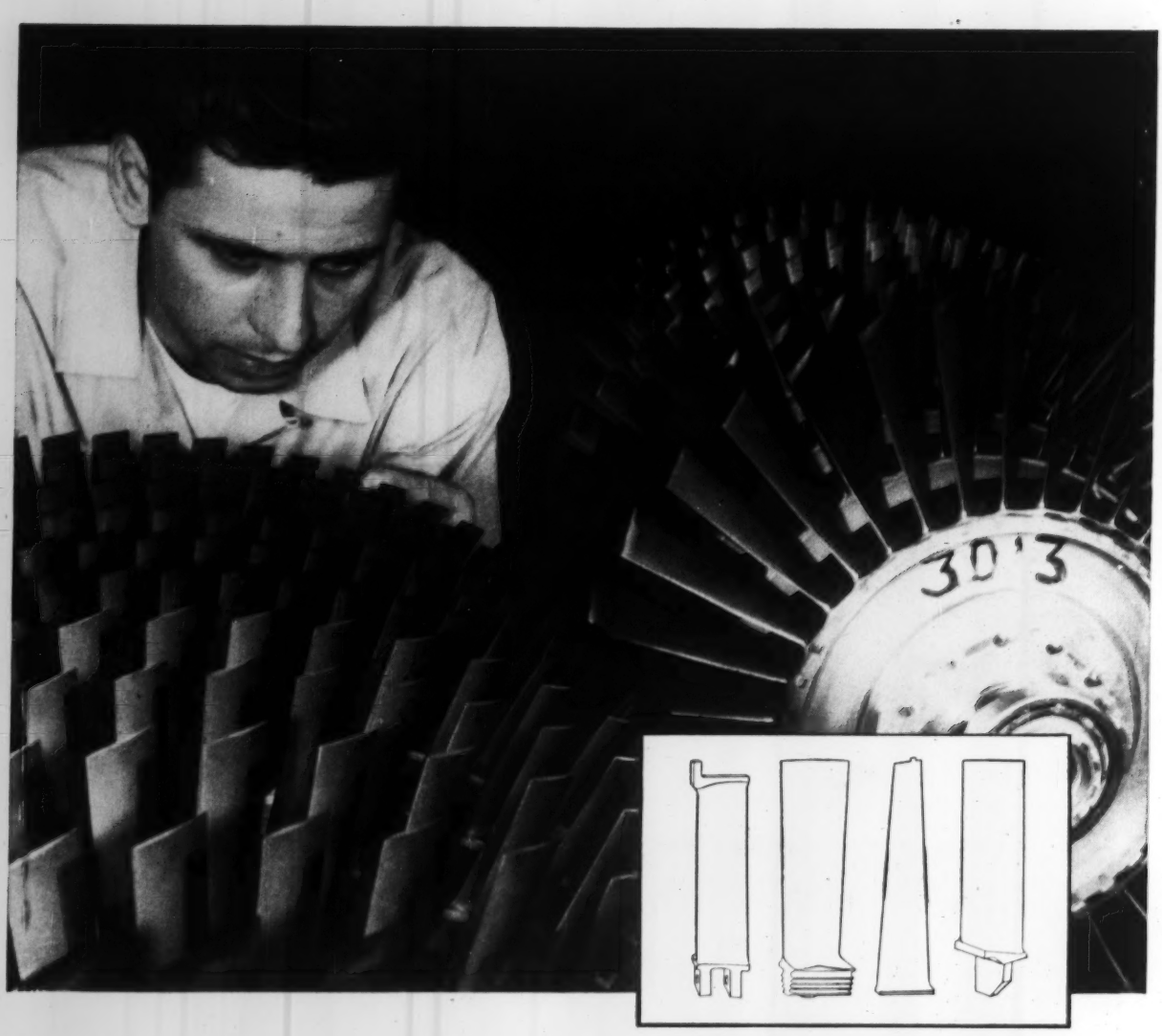
GRAPHITED
over 175 sizes

GENERAL PURPOSE
over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

LEDALOYL
over 400 sizes

ELECTRIC MOTOR
over 350 sizes



Curtiss-Wright **PROTOTYPE SERVICE** speeds you from blueprint to working model

Here's the fast, efficient and economical way to get working models from your turbine or compressor blade designs . . . whether you want a single prototype or test production quantities. Curtiss-Wright's Metals Processing Division scales down its complete facilities in a modern, geared-to-speed prototype shop . . . brings under one roof all the production steps from primary metal to finished product in any high integrity alloy.

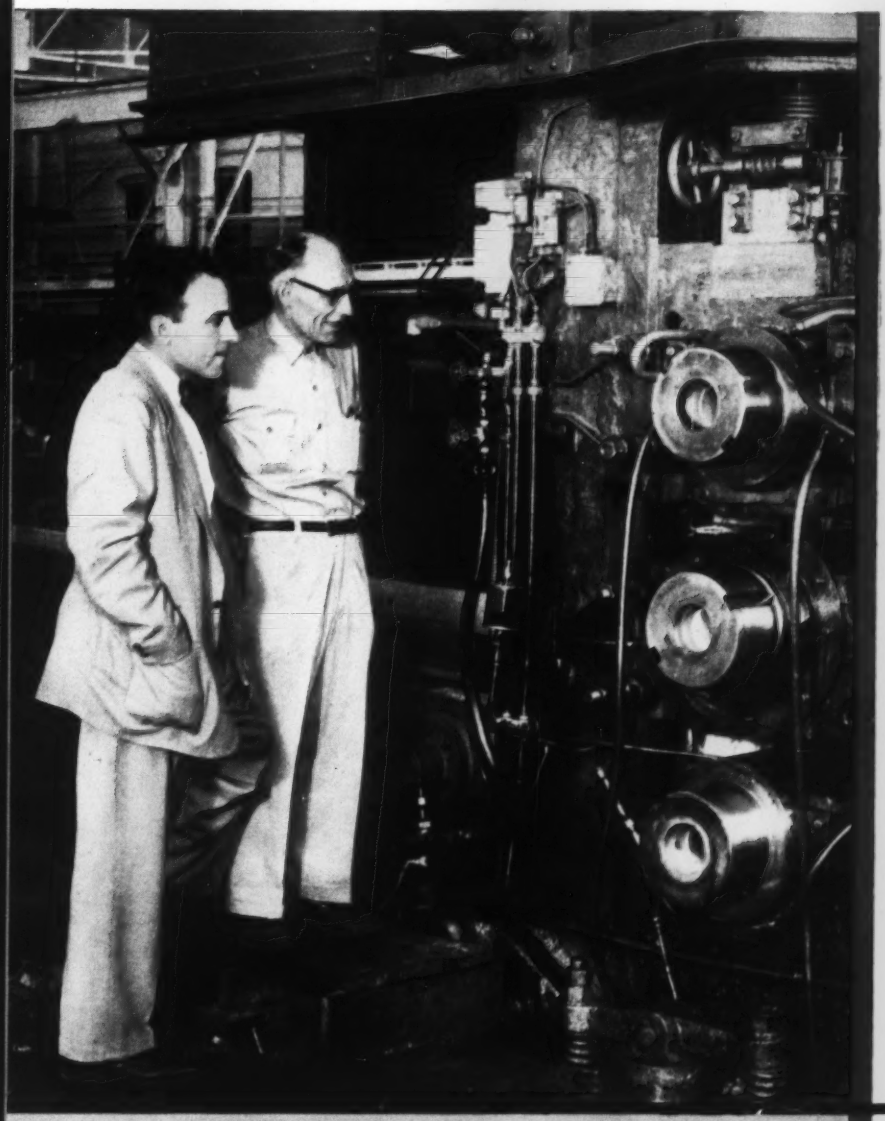
Working model production brought to a fine point of precision control means more accurate development now . . . smoother flowing production later. Coordinated facilities for casting, forging, grade rolling, machining and extrusion are ready to serve you on short notice . . . solve your problems in a hurry. Contact Curtiss-Wright when your next set of designs leaves the drafting board. Qualified engineering consultation available at all branch offices.

For complete details, write to: 80 Grider Street

METALS PROCESSING DIVISION
CURTISS-WRIGHT
CORPORATION • BUFFALO, NEW YORK

METALS PROCESSING DIVISION BRANCH OFFICES: . . . NEW YORK • HOUSTON • LOS ANGELES

Sick slab roll recovers fast with application of STANOGEAR *Compound*



Eugene Ewald (right), Mill Foreman, and Marshall Fox, Standard Oil lubrication specialist, inspect slab roll. STANOGEAR Compound helped solve lubrication problem on roll neck bearings.

Marshall Fox who proposed switch to STANOGEAR with resultant improved operation, is experienced in providing such technical service. Marsh has a Mechanical Engineering degree from Purdue to qualify him for this work. In addition, he has completed Standard's course for sales engineers. This experience and training, customers find, pay off for them.

A slab roll at Matthiessen & Hegeler Zinc Company, La Salle, Illinois, was sick. It suffered from repeated roll neck bearing failures. Bearing temperatures couldn't be controlled. A consultant was summoned—Marshall J. Fox, Standard Oil lubrication specialist. His diagnosis and remedy: Install STANOGEAR Compound and equip the machine with a central pressure system for application. Recommendations were followed. Result: No bearing failures, due to faulty lubrication, since. Maintenance costs reduced. Time lost through breakdowns slashed.

This was a condition made to order for STANOGEAR to remedy. And Matthiessen & Hegeler knew there was a man at hand who could suggest what should be done. It's another demonstration of what this unbeatable combination can do when put to work:

1 **Standard Oil lubrication specialists capable of giving technical help.**

2 **Top quality products *that deliver results required.***

STANOGEAR Compounds contain special additives making them suitable for applications where heavy loads cause welding, seizure or scoring.

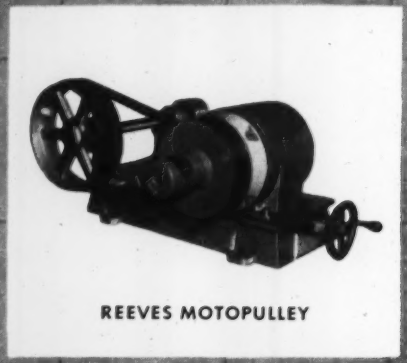
In the Midwest and Rocky Mountain states, a Standard Oil lubrication specialist in your nearby Standard Oil office will gladly give you more information about STANOGEAR. Call him. Or contact Standard Oil Company, 910 So. Michigan Avenue, Chicago 80, Ill.

STANDARD

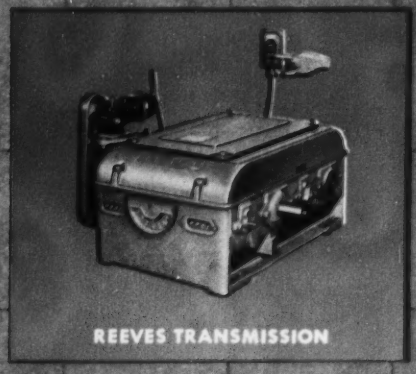
STANDARD OIL COMPANY

(Indiana)

V•S DRIVES



REEVES MOTOPULLEY



REEVES TRANSMISSION

WIDENING THE HORIZONS OF

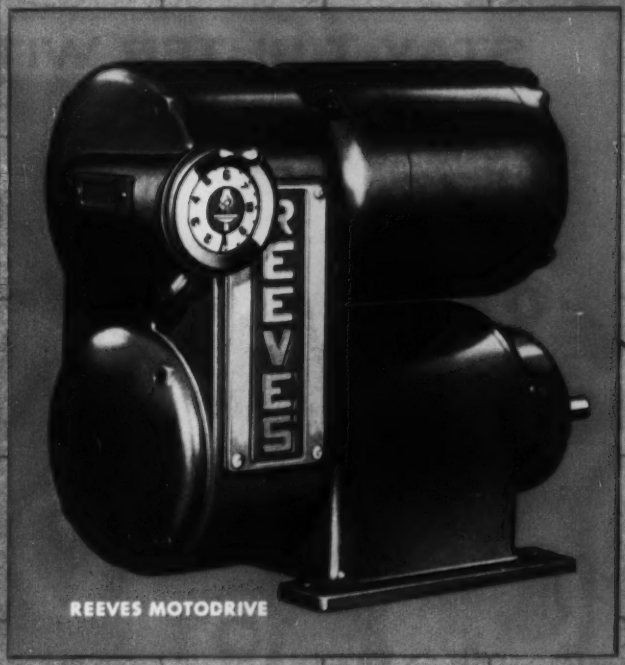
Automation is the key to greater production of more goods and services at lower cost. The Tools of Automation can be applied profitably in a countless number of individual industries.

Reliance can provide *you* with valuable engineering assistance which can help secure the advantages of automation.

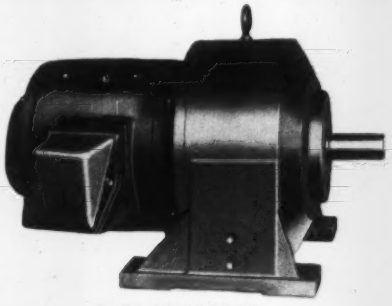
Our Tools of Automation consist of electric motors, variable-speed drives and controls.

RELIANCE

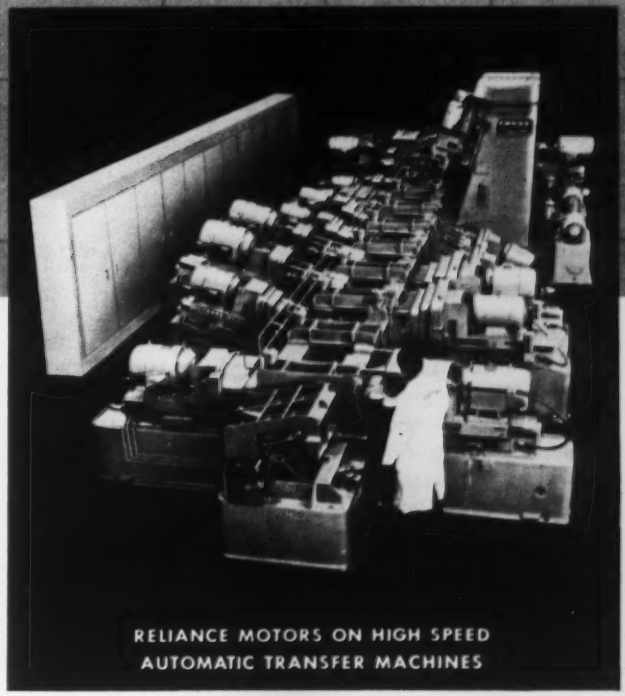
TOTALLY-PROTECTED MOTORS



REEVES MOTODRIVE



GEARMOTORS



RELIANCE MOTORS ON HIGH SPEED AUTOMATIC TRANSFER MACHINES

AUTOMATION

Application of these tools ranges from a single motor to multi-motor drives for highly complex production lines, where materials are processed into finished products in one continuous operation.

The world's largest manufacturer devoted exclusively to the production of quality motors and drives is ready to help you widen the horizons of automation in your plant.

Bulletin No. A-1555-B gives further details.

A-1519

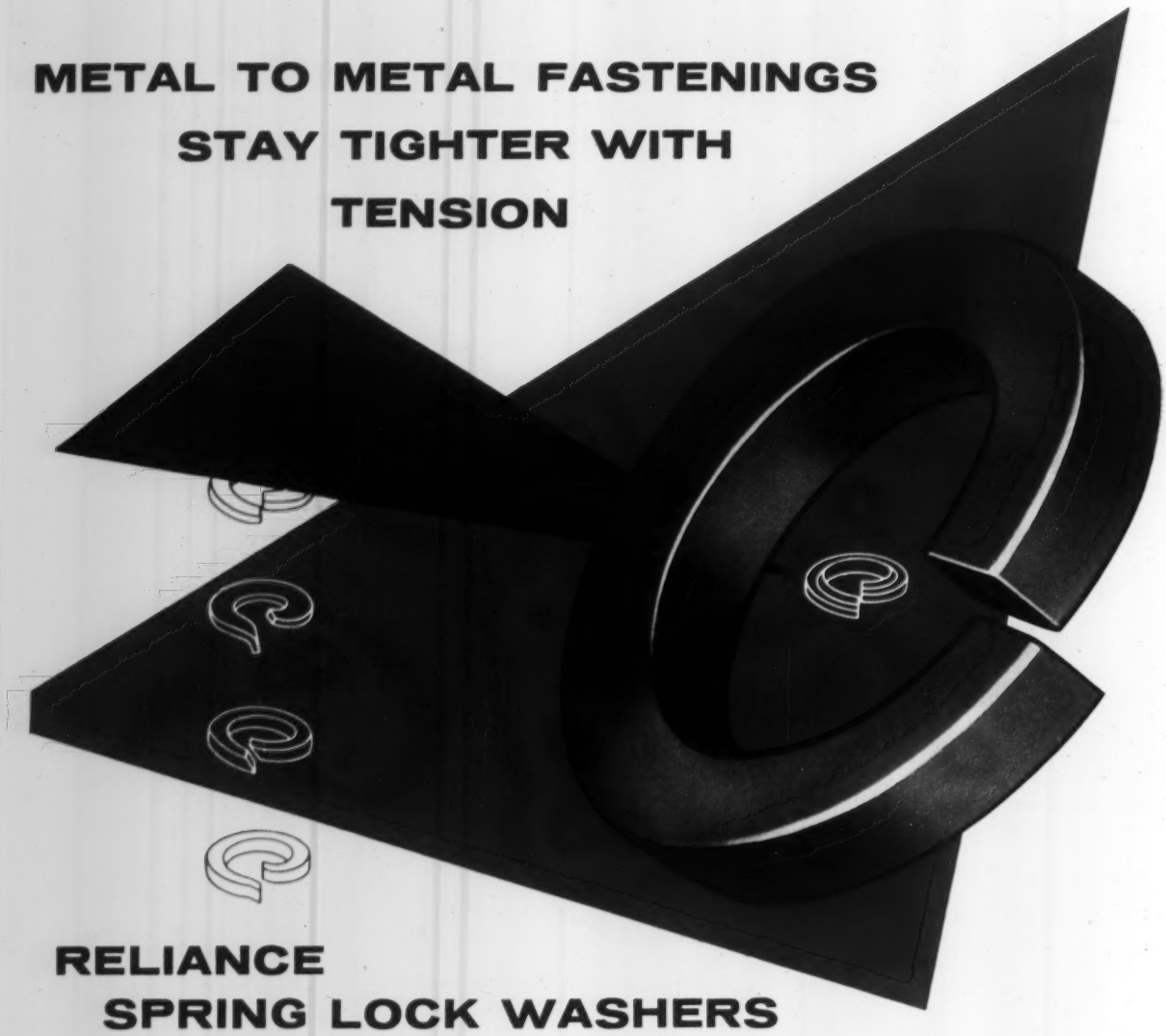
ELECTRIC AND ENGINEERING CO.

DEPT. 412A, CLEVELAND 10, OHIO

Canadian Division: Welland, Ontario • Reeves Division: Columbus, Indiana

Sales Offices and Distributors in Principal Cities

METAL TO METAL FASTENINGS STAY TIGHTER WITH TENSION



RELIANCE SPRING LOCK WASHERS

Metal products assembled by the tried and true nut/bolt method need more than just tight fastenings at the end of the production line. This especially is true of products subject to movement, vibration, stresses and strains. Metal wears, bolts stretch; and a fastening can become loose even though the nut doesn't turn. One solution to this problem is the application of constant tension to the assembly supplied by Reliance Helical Coil Spring Lock Washers.

These are the same high quality Spring Lock Washers on which the metal working industry has depended for forty-two years. They are made of cold drawn spring steel and are quality controlled throughout the manufacturing operation. For the complete story, write for your free copy of Reliance Engineering Bulletin W-50.

EATON

RELIANCE DIVISION
MANUFACTURING COMPANY
514 CHARLES AVENUE • MASSILLON, OHIO

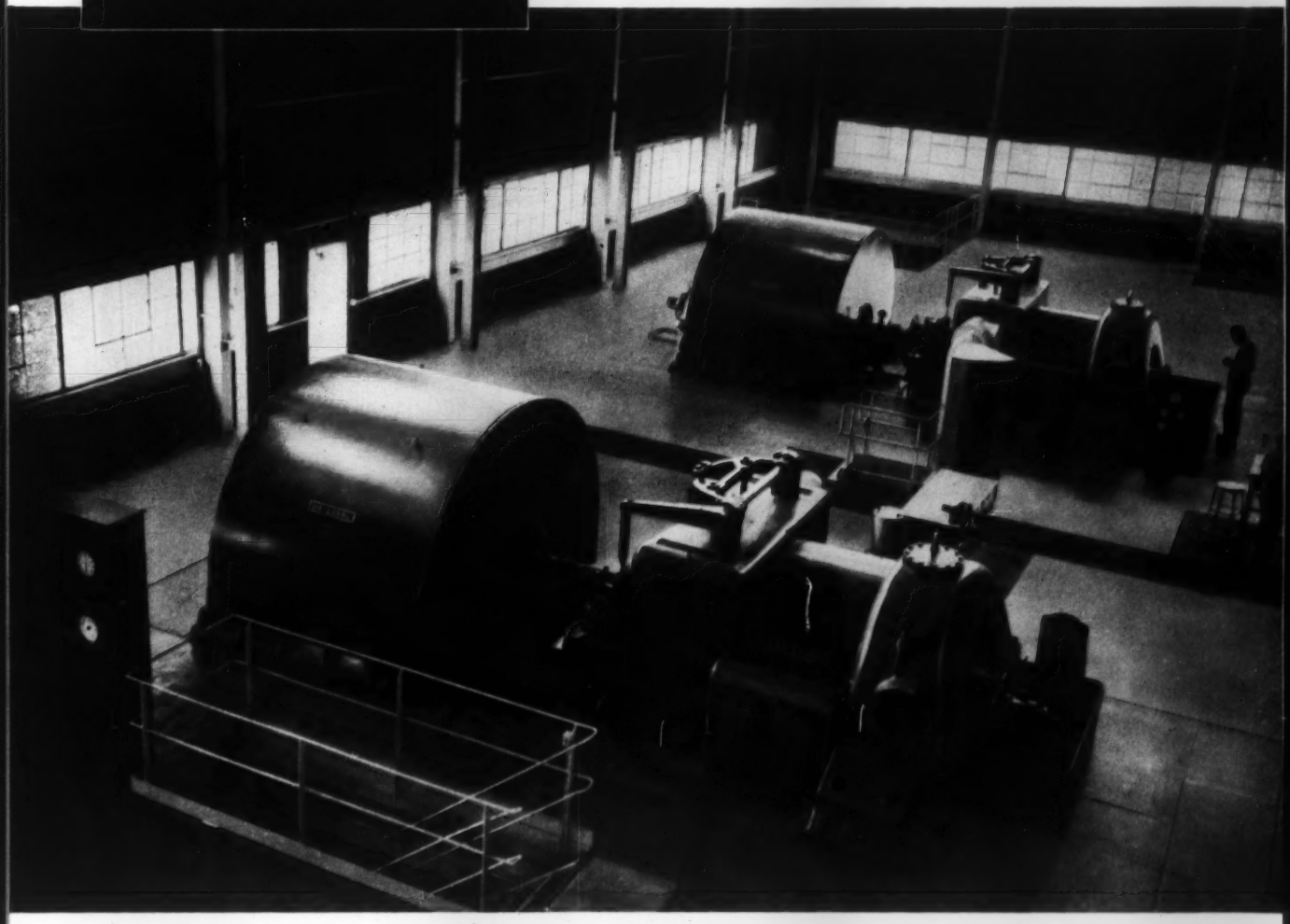
SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

DE LAVAL

BLAST FURNACE BLOWERS

deliver 110,000 cfm each for McLouth Steel



These two De Laval turbine-driven centrifugal blowers do a round-the-clock job in the McLouth Steel plant, Trenton, Michigan. Each has a rated capacity of 110,000 cfm of air; discharge pressure is 30 psig. Each is driven by a 12,400 hp, 2950 rpm De Laval steam turbine operating under steam conditions of 600 psig, 825 F with 2″ hg.

De Laval compressors are designed individually for each application to assure maximum efficiency and range of operation. Construction is rugged throughout. Casings and perfectly balanced rotors are built to take punishment. All parts are precision-made to limit gages. Materials are selected which will best meet the particular conditions of corrosion, pressure and temperature.

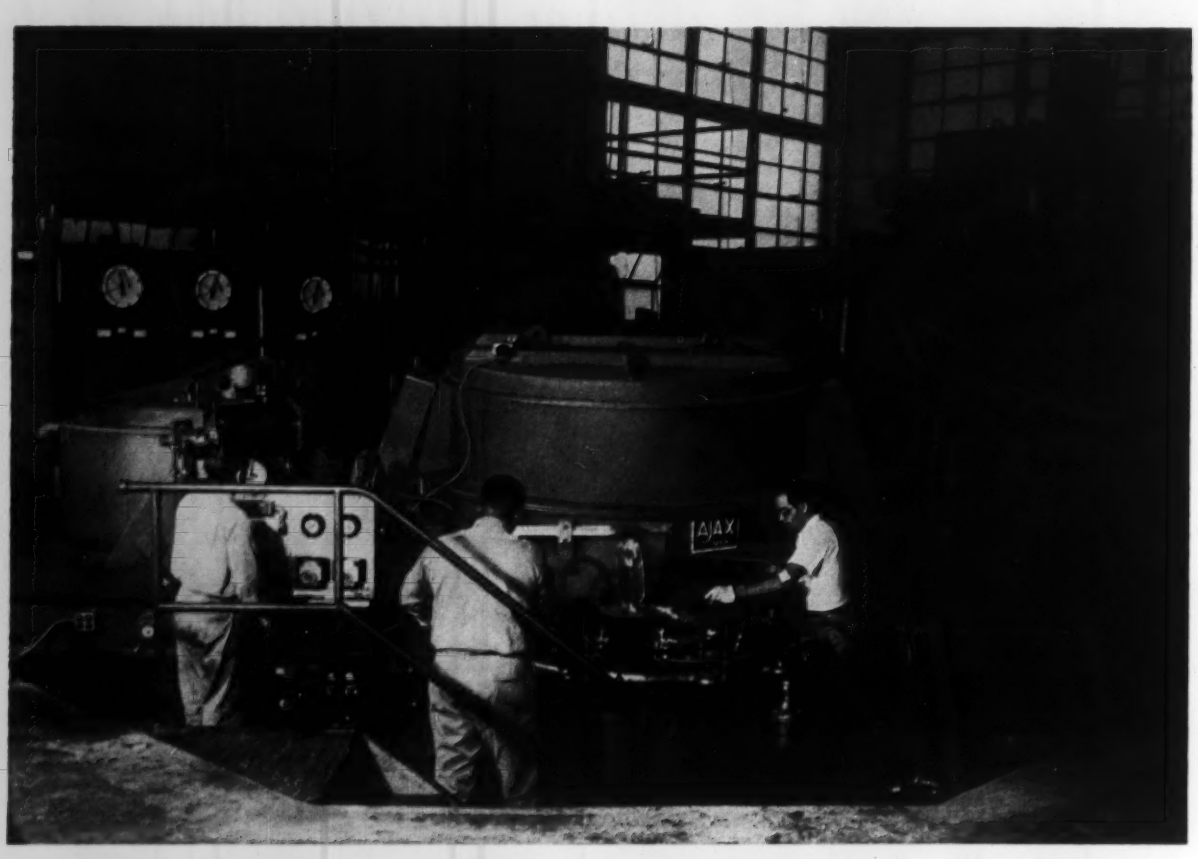
De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.

Send for Bulletin 0504

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY

860 Nottingham Way, Trenton 2, New Jersey



MODERN ALUMINUM BILLET CASTING

Only the best in extrusion billet quality is good enough for **The Himmel Brothers Company**, Hamden, Conn. They produce architectural aluminum extrusions, most of which are subsequently anodized. Their new electric billet casting shop using an integrated group of induction melting furnaces has assured a consistent supply of top quality extrusion billets.

Billets are turned out at the rate of 2000 lbs. per hour by one supervisor and two men. Clean and cool working conditions, extensive automation, and negligible furnace maintenance provide a high return on this investment.

We should be pleased to give you more facts about this modern way of melting aluminum.

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax-Holtgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

ANOTHER NEW DEVELOPMENT IN PACKING DESIGN

PRE-FORMED SHOULDER AND FLARE MAKE CUP PACKINGS FIT BETTER

Houghton's newly designed leather cup packings are pre-formed. They *fit* the square corner normally found between the end of the piston and the cylinder wall.

As a result, there is no distortion of the packings under operating pressure. They are not forced into a *new* shape which would cause premature wear, fracture or breakdown at the heel. In addition, the side walls are molded with a slight flare which provides sufficient pre-loading for perfect sealing at minimum pressures.

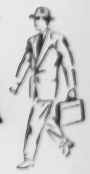
This leadership in hydraulic know-how is typical of Houghton, who makes all types of hydraulic and pneumatic packings, as well as a complete line of hydraulic oils and fluids.

Standardize on Houghton. You'll get the newest first—and the best always. Call your Houghton Man and let him explain Houghton's Hydraulic Service. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

. . . products of

E F HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO



Ready to give you on-the-job service . . .

BLAW-KNOX

makes what it takes

to hot roll high-tonnage

top quality sheet

This CONTINENTAL 80-inch, 6-stand continuous hot strip mill in the United States Steel's Gary Sheet and Tin Mill was designed and engineered for heavy duty and high-speed finishing. It is well-known throughout the industry for excellent tonnage performance and quality.

In addition to these large mills, Blaw-Knox builds single-stand reversing hot strip finishing mills, complete with all auxiliaries.

Blaw-Knox designs and builds *complete* rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

BLAW-KNOX COMPANY
Foundry & Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

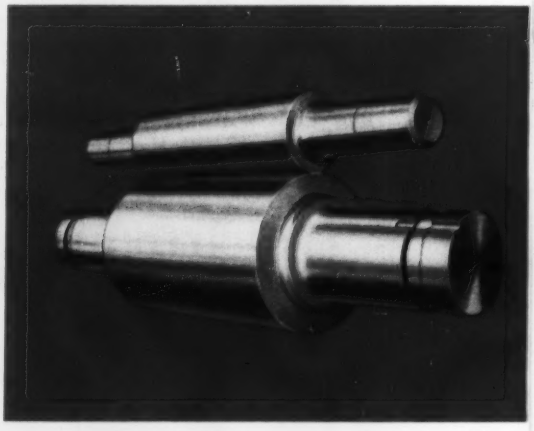
Complete rolling mill installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills . . . roll lathes • chippers • special machinery • and complete auxiliary equipment

50th Anniversary
BLAW-KNOX
1906-1956

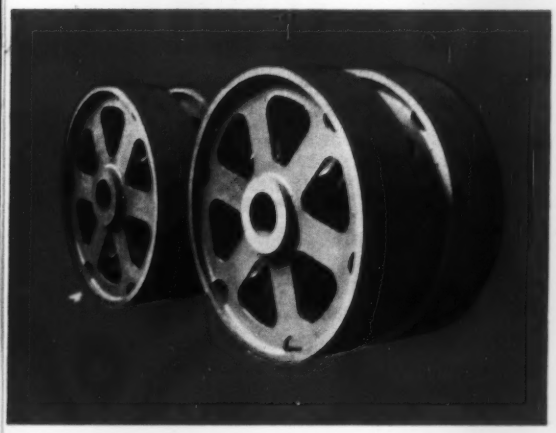
CONTINENTAL

ROLLS—Iron, alloy iron and steel rolls for all types of rolling mills.

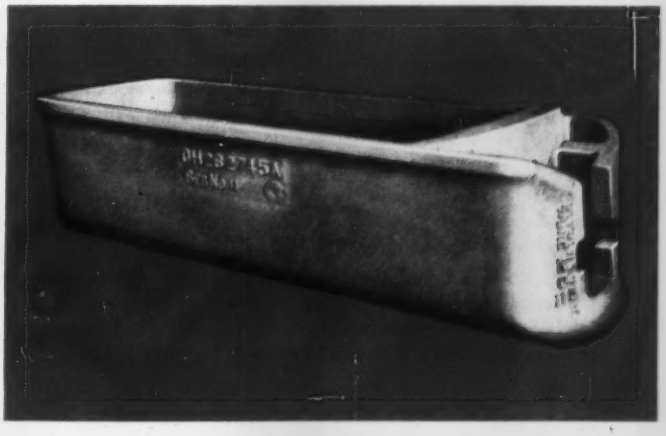


CONTINENTAL 80-inch continuous hot strip mill in the Gary Sheet and Tin Mill of the United States Steel Corporation.

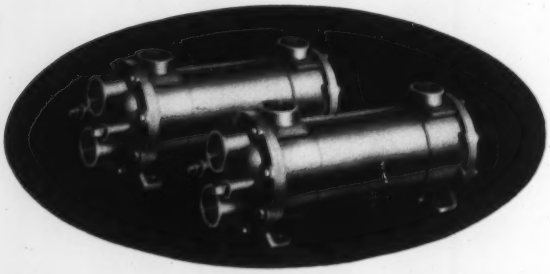
WELDMENTS—fabricated steel plate, or cast-weld design.



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

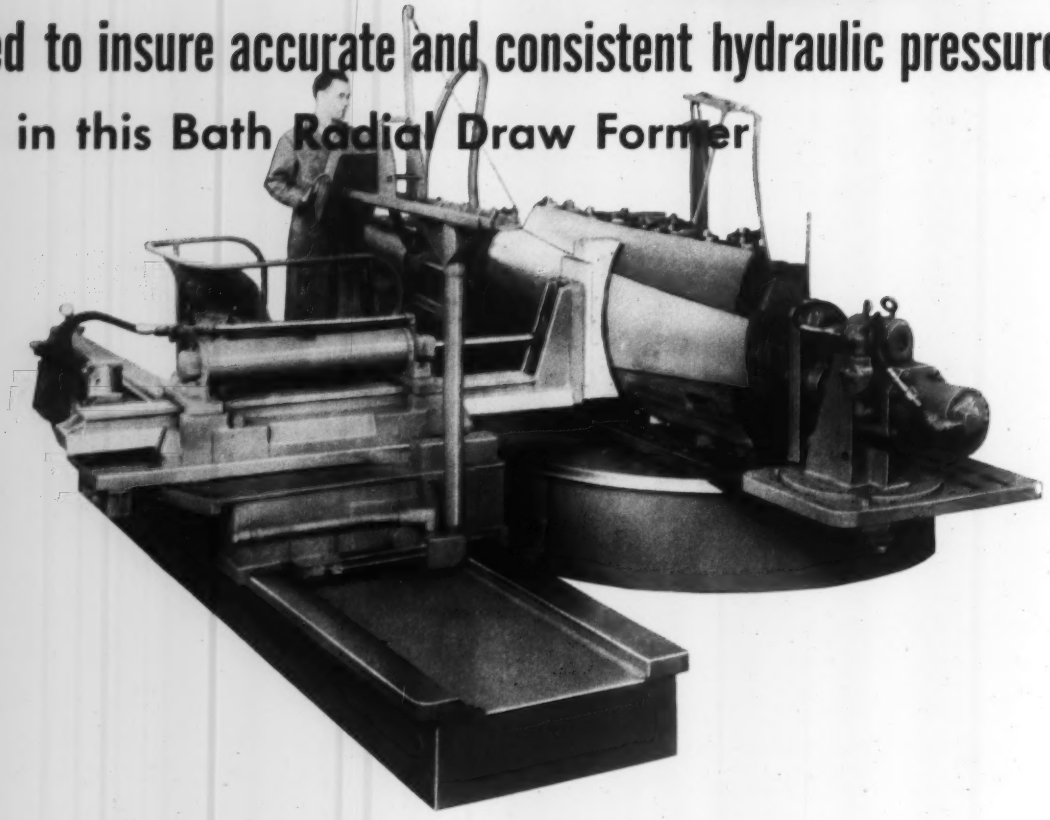


ROSS EXCHANGERS



"used to insure accurate and consistent hydraulic pressures"

in this Bath Radial Draw Former



Turning out contoured parts for jet aircraft and missiles, this Bath Type CF-25 Radial Draw Former combines two hydraulic systems in a unique *stretch* and *squeeze* process. Aluminum, stainless steel, titanium and other ductile metals are stretched to yield point, then bent around a die by an unusual *ironing* method.

Providing safe, dependable cooling of the oil for the hydraulic stretch ram and compression ram are two Ross Exchangers. Carefully controlled temperatures maintain oil viscosity, thereby insuring rated hydraulic power for these exacting stretch and compression operations.

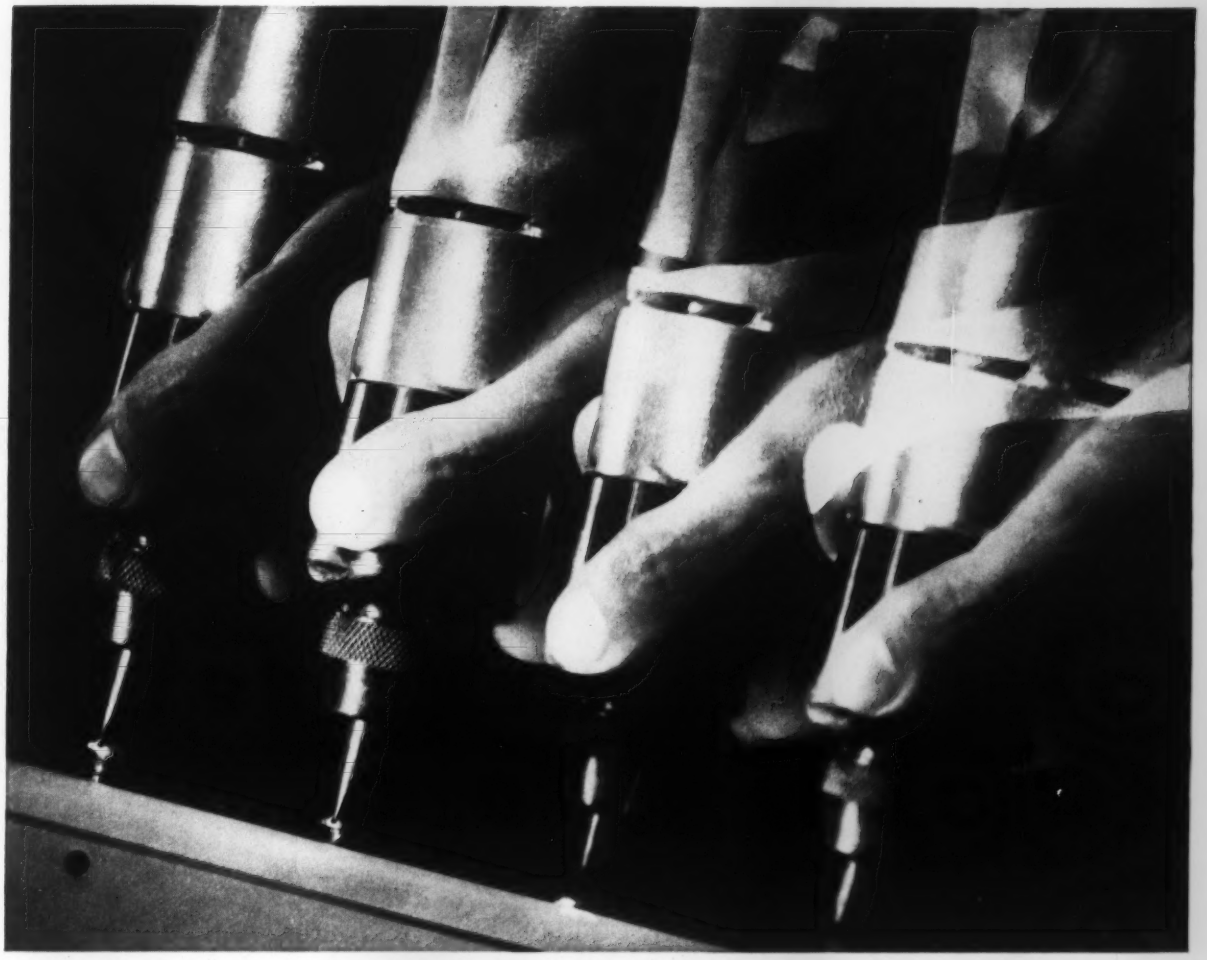
"Ross Exchangers", states the Cyril Bath Co., "are used to insure accuracy and consistency in hydraulic pressures as well as protect the hydraulic system from the damages that occur with over-heating. In many years of using Ross Exchangers, we have found them completely effective and trouble free in operation."

Widely specified for numerous other types and makes of hydraulic machinery, Ross Exchangers are pre-engineered, fully standardized and available in a wide range of sizes to fit your needs.

Learn more about these rugged, non-ferrous units that are unequaled in thermal efficiency. Write for Bulletin 1.1K5. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N.Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS

ROSS HEAT EXCHANGER PRODUCTS



Is assembly one of your largest production costs?

It probably is. Wherever fastenings must be made, this simple truth applies: The cost of the fastener is but a tiny fraction of the cost of using that fastener in production. The key to reduced assembly costs is the fastener that helps high-paid assembly hands turn out better work—*faster*. The P-K® Self-tapping Screw is that fastener!

Using screws that don't come up to P-K standards can raise total assembly costs as much as 25%. Screw failures not only result in assembly slow-downs . . . but in parts spoilage and hidden weaknesses as well. This is especially true in assembly by automation. Uniformity, such as P-K Self-tapping Screws offer, is automation's prime requirement for trouble-free assembly.

Why not talk to a Parker-Kalon Assembly Engineer —a man who is in daily contact with many different assembly set-ups. Perhaps he can show you how to reduce the number of fastenings in your product or how to solve a particularly difficult fastening problem. (That's his business.) Contact him through your local Parker-Kalon distributor.

***PARKER-KALON DIVISION**, General American Transportation Corporation*
Manufacturers of Self-tapping Screws, Socket Screws, Screwnails, Masonry Nails, Wing Nuts and Thumb Screws

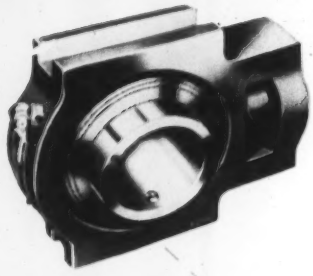
PARKER-KALON® fasteners

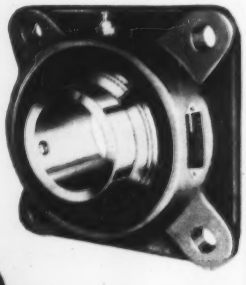
Sold Everywhere Through Leading Industrial Distributors
Factory: Clifton, New Jersey—Warehouses: Chicago, Illinois—Los Angeles, California

SEALMASTER

BALL BEARING UNITS!

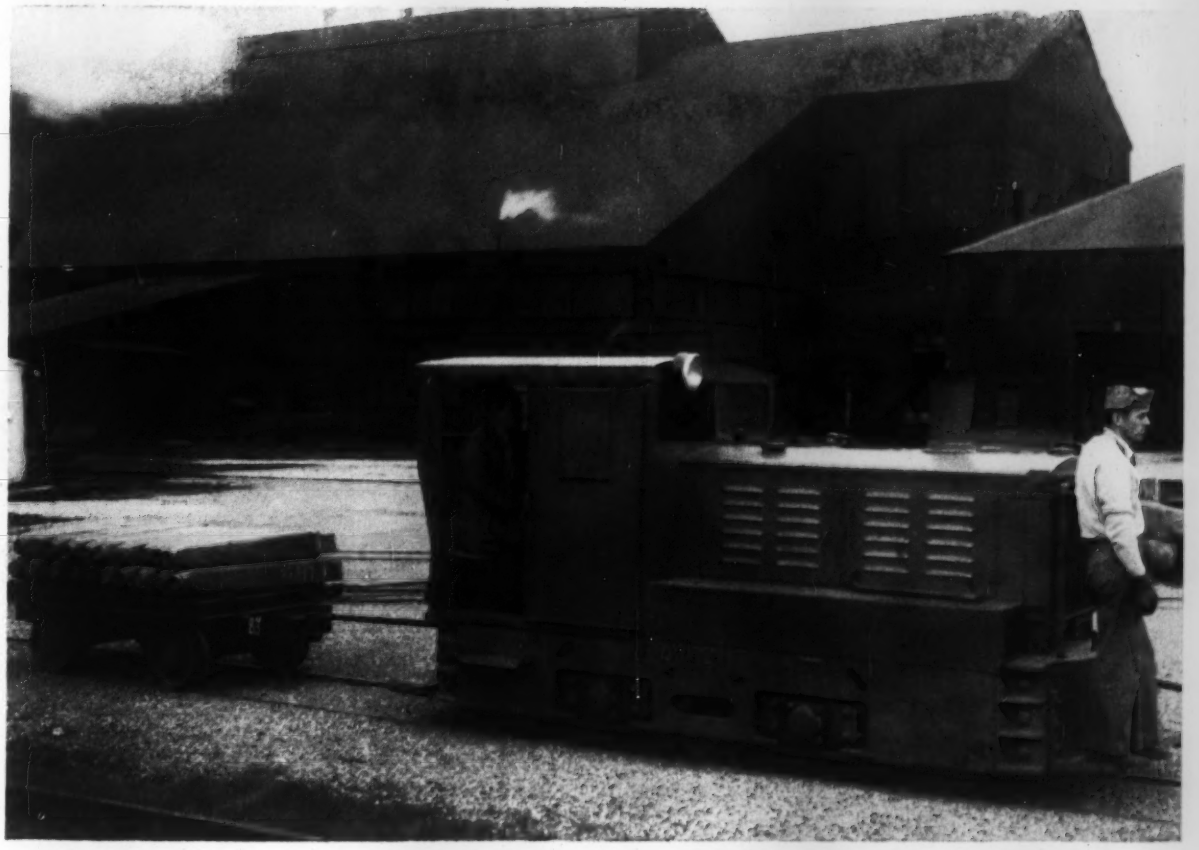
Automatic operation is the key to both lower unit production cost and increased quality. SEALMASTER Ball Bearing Units incorporate an exclusive combination of features to meet the requirements of today's automatic production. SEALMASTER engineers working closely with machinery manufacturers are constantly developing features to keep pace with tomorrow's production. You'll want full information on SEALMASTER'S exclusive combination of features—a vital factor in the quality and performance of the machinery you build or buy.





Write for Bulletin 454. It's a must for your file.

SEALMASTER BEARINGS A DIVISION OF STEPHENS-ADAMSON MFG. CO., 99 RIDGEWAY AVENUE, AURORA, ILLINOIS



PLYMOUTH TORQOMOTIVE

SLASHES REPAIR COSTS AND DOWN TIME

for Colonial Steel Division

"We were plagued with repair costs and harassing delays until we replaced our mechanical drive locomotive with this 7½-ton Plymouth Torqomotive," says the Works Manager of Colonial Steel Division.

"Besides eliminating repair costs during the four years we have operated the Torqomotive, we have spent an average of only six hours a month for routine maintenance. Starts and stops—and we have plenty of them—are much smoother now, and our operators like the ease with which they can switch and spot the cars."

Yard work is hard work—but just one of the many jobs a Plymouth handles with ease. Whatever your hauling, switching or spotting problems, there's an answer in Plymouth's dependable, cost-cutting performance. Models range from 3 to 80 tons. Gasoline or Diesel, mechanical or Torqomotive Drive.*

Write today for a free catalog giving details and performance data. PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-1, Plymouth, Ohio.

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

TUBING

every kind in stock

- Seamless Mechanical
- Welded Mechanical
- Fluid Power Tubing
- Structural Tubing
- Boiler Tubes
- Stainless Steel Tubing

You'll get quick delivery on steel tubing for every purpose from Ryerson. The nation's largest tubing stocks —fast, accurate cutting service . . . and an experienced staff of tubing specialists—all are at your command.

So call Ryerson for everything in tubing and tubing service, whatever kind or quantity you need.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

Metalworking Outlook

December 3, 1956

Cost of Living Climbs

Look for the cost of living to continue its rise in December. In October, latest month for which figures are available, the consumer price index rose 0.5 per cent to 117.7 per cent of the 1947-1949 average. November figures will show a rise of about the same degree. The October index means 2 cents an hour must be added to pay checks of hourly rated workers in the auto industry, effective Dec. 1. Some 120,000 Westinghouse Electric Corp. employees get 1 cent more, also effective Dec. 1. The projected continuing rise in the index indicates steelworkers will get a hike of at least 3 cents in January.

Coming: New Small Business Definition

You can expect a new definition of small business. It will come from the Small Business Administration in two or three weeks and will probably relate to government procurement policies (not loans). In fiscal 1956, small businesses got $3.5 billion worth of defense contracts. SBA thinking: They could have obtained $5.5 billion worth, but didn't want it, or didn't know about it. A new definition will leave the same number of companies qualifying as small businesses, but there will be some changes—perhaps fewer tool and die makers and more electronic firms will qualify.

Pentagon To Boost Progress Payments

The Defense department will pay contractors more of their money faster. As a result, they won't have to tie up their own funds as long in production expenses. The move aims at helping small business, but large contractors will benefit, too. The major effect of the order will be to boost the progress payments companies receive for defense goods in process. In certain cases, such payments can amount to 75 per cent of total costs the manufacturer has run up.

Better Farm Equipment Year in '57?

Estimates of farm equipment sales in 1957 range from as good as those in 1956 to 15 per cent better. The Soil Bank program shrinks the need for equipment—less acreage is planted. So, replacement business next year may become more important than the expansion market.

Machine Tool Builders Roll

Here's a quick look at how machine tool builders are doing: Cincinnati Milling Machine Co. will have shipments in excess of $145 million this year and expects to continue running at capacity through 1957. Warner & Swasey Co.'s sales (including road equipment) will surpass $55 million this year, compared with $40.3 million in 1955. National Acme Co. expects shipments this year to rise about 25 per cent above 1955's, and performance in 1957 should be equal to 1956's. Monarch Machine Tool Co.

Technical Outlook—p. 119 Market Outlook—p. 171

will ship $17 million worth of equipment this year and expects that rate of activity to "continue into 1957."

Mr. Homer Raises Sights

A. B. Homer, president of Bethlehem Steel Co., is raising his estimates of steel expansion needs. He thinks an ingot capacity of 200 million tons will be required by 1971, compared with the 132 million tons we have now. That means an average annual boost of more than 4.5 million tons in the next decade and a half. A year ago, Mr. Homer foresaw the need to increase ingot capacity an average of 4 million tons annually for 15 years, a target widely accepted in the industry. Currently, steel expansion is under way or authorized to the tune of 15 million tons over the next three years, a rate that exceeds Mr. Homer's new estimates. But he asks: Can we keep that pace when expansion costs $300 to $400 per ton of annual ingot capacity?

Dow Makes Purer Magnesium

Dow Chemical Co. is producing purer grades of magnesium pig and ingot for use in the production of titanium, zirconium, beryllium and uranium. Dow is nearing completion of tests on another grade which should be even more suitable for production of those metals. Output is at its Freeport, Tex., plant and at the government-owned facility it operates at nearby Velasco, where for years it has produced magnesium of about 99.8 per cent purity—which is adequate for all structural applications and all but a few chemical ones (see magnesium roundup on page 90). Prices f.o.b. Freeport, on higher purity magnesium, range from 35.75 cents per pound to 43.25 for pig and 36.5 to 44 for ingot.

Capital Outlays and Depreciation

Manufacturing firms have spent $85 billion on new plants and equipment since 1946—two-thirds of it on equipment. A Commerce department report indicates: The current rate of depreciation allowances would be about $7 billion a year, instead of $5 billion, if industry could compute its allowances on the basis of replacement cost, rather than acquisition cost.

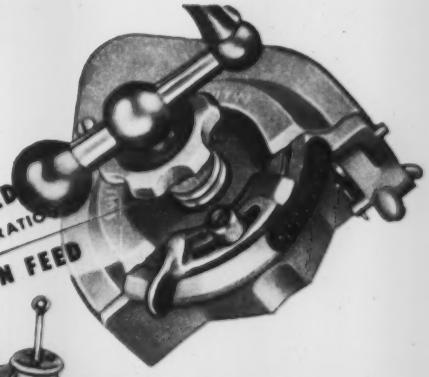
$90 Billion by 1976?

The output of electrical goods may hit $90 billion by 1976 (at current prices), compared with $20 billion this year. So predicts Ralph J. Cordiner, General Electric Co.'s president. The number of firms in electrical manufacturing has risen from 4400 in 1945 to 5600 in 1953, he points out.

Straws in the Wind

Liquefied natural gas may be transported by ocean tankers; the U.S. Coast Guard will soon rule on tanker specifications . . . Calumet & Hecla Inc. has discovered a substantial body of uranium ore near Grants, N. Mex. . . . AFL-CIO's Industrial Union Department will hold a conference on white-collar unionization in Washington, Dec. 13 and 14.

ever see a METAL SAW that thinks for itself?



MARVEL SAWS' Automatic "Brain" Adjusts Blade Feed Pressure and Depth on Every Stroke to

GIVE YOU FASTER CUTTING-OFF

The exclusive automatic Dual Power Feed built into every MARVEL Series 6 and 9 Hack Saw is the "brain" that adjusts and compensates both pressure and depth of feed correctly in proportion to the number of blade teeth in contact with the work. Once the MARVEL Dual Feed is set, no operator attention is required to insure that the blade is cutting as deeply as possible and practical on every stroke . . . regardless of the changing area of the work being cut. Whether the Saw is being used for continuous automatic cut-off of identical pieces or a single cut, the MARVEL Dual Feed that practically "thinks for itself" guarantees that the work is cut-off in the fewest possible number of strokes.

Write for the MARVEL Catalog and complete details on MARVEL Saws

Heavy duty MARVEL Series 6 and 9 Hack Saws embody every practical design and operating feature to give you speed, accuracy and operating economy you can find in no other metal cutting saws.

S-1304

ARMSTRONG-BLUM MFG. CO.
5700 BLOOMINGDALE AVE. · CHICAGO 39, ILL.

MARVEL Metal Cutting SAWS
Better Machines—Better Blades

Alnico permanent magnets power the new Eriez Ferrotrap, visible above at left of the paper. Trap body and cover plate are Type 316 stainless chromium-nickel steel, non-magnetic and easy to clean.

How Alnico guards products and machines ...traps tramp metal continuously

This operator holds a collection of nails, paper clips and other ferrous contaminants. All were removed by the Eriez Ferrotrap from liquid caramel being pumped through a candy plant pipeline.

Keeping hot, viscous caramel free of tramp iron is an obviously difficult task. But a new Eriez unit, aptly named the Ferrotrap, does this sort of job with multiple rods or "fingers" containing Alnico permanent magnets.

No need for electromagnets, current and accessories, because at temperatures up to 850°F the powerful, life-time magnetic strength of a high nickel alloy . . . Alnico . . . assures positive trapping of iron particles. Even nuts, bolts, and the like.

Units that protect not only product purity, but also filters, mixers, pumps and other costly equipment are made practical by the powerful magnetic properties of Alnico, an aluminum-nickel-cobalt-iron alloy.

Nickel . . . an essential element in Alnico . . . improves hundreds of other alloys utilized in industry. So if you have a problem involving metals, consult us on the use of nickel or nickel alloys. But if you wish further information about the Ferrotrap, write Eriez Manufacturing Company, Erie 6, Pennsylvania.

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.

What Labor Wants

The aims and ambitions of the amalgamated American Federation of Labor and the Congress of Industrial Organizations are set forth in a new book, *AFL-CIO: Labor United,* by Arthur J. Goldberg.

Mr. Goldberg says he does not speak officially for the infant AFL-CIO (it celebrates its first birthday Dec. 5, 1956). But he speaks with authority. He was general counsel for the CIO before the merger and now is counsel for both the AFL-CIO and the United Steelworkers.

He says labor unions are no monopoly. He strongly opposes government control or regulation of them. His argument is that the AFL-CIO is not a "giant trust" (like a big corporation) but a voluntary association of autonomous unions. Its 140 affiliated unions are not "told" how to handle their most important function: Collective bargaining with employers.

Mr. Goldberg states that a labor party has no appeal to American unions and will not so long as they are able to better the conditions of their workers within the framework of our domestic political economy. But, he adds, the political action work of the AFL-CIO will be intensified. More manpower will be available for lobbying. The federation will be a tremendous influence in support of economic and social welfare legislation, civil rights measures and other legislative proposals which affect or *interest* union members. It also will have an influence on the shaping of U.S. foreign policy.

Of the 65 million Americans gainfully employed in mid-1955, only 17 to 18 million were union members. So Mr. Goldberg sees the opportunity to organize large segments of industry, plus millions of white-collar people who earn less than industrial workers. Large-scale organizational successes, he contends, are bound to create economic ripples that will move from industry to industry.

He gives credence to David J. McDonald's concept of "mutual trusteeship." Union leaders and company executives can build our great enterprises for the benefit of the worker, yet recognize that profits are necessary to provide a return to investors and funds for progress.

He points out that a long-range goal, a shorter work week, is fast becoming a short-range objective because of increasing automation.

Mr. Goldberg says that labor has no secrets, that its long-range plans are as unclassified as its short-term tactics. Yet when we analyze his statements on significant points, we must conclude that eventually the AFL-CIO intends to play a powerful, more dominant role in managing not only our national economy but individual enterprise.

That is what labor wants.

Irwin H. Such
EDITOR-IN-CHIEF

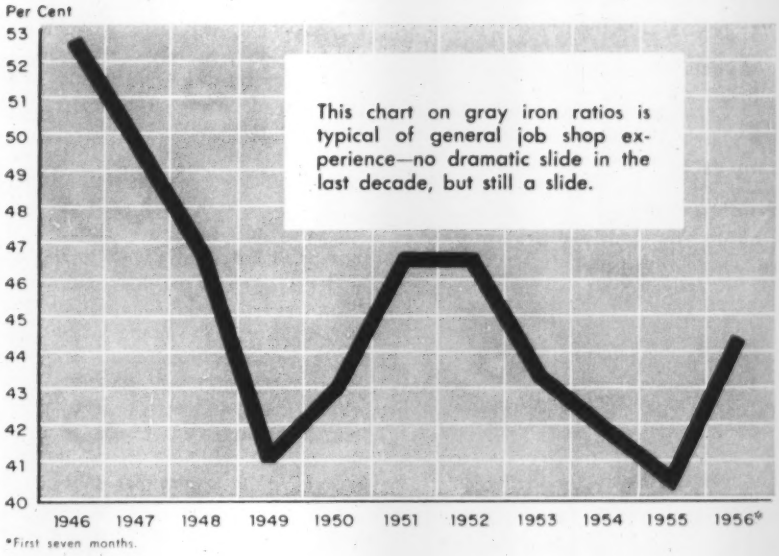
WHY THE FEED BAG BECAME A FLOWER POT

Remember horses? They were strong, kindly four-legged animals and they used to be essential in our lives, particularly on the farm. Then, in just a few short years, the farm equipment industry changed everything. Today's mechanized farmer produces more with less work, and enjoys more of the good things of life. Improvements in farm equipment have often gone hand-in-hand with progress in steelmaking. And, at Inland, we've been working for many years at the job of producing the *right* steels for better farming.

INLAND STEEL COMPANY *38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the farm equipment industry include hot and cold rolled sheets and strip, Ti-Co galvanized sheets, bars. Other products: plates, structurals, 4-Way safety plate, tin mill products, reinforcing bars, rails and track accessories, coal chemicals.*

Job Shops' Share Slips

(% of total miscellaneous gray iron shipments for sale)



Open Letter to Job Shops

Dear Mr. Job Shop Operator:

We are disturbed by a situation which, in our opinion, calls for comments we do not make in a conventional article.

We have just interviewed some 70 job shops across the country—companies that make tooling, produce parts or perform services. Generally, business looks good for 1957. Yet—and here's the point—not since the 1930s have we heard so many complaints, such bitterness about the lot of the contract manufacturer. Listen:

"My business is 75 to 80 per cent automotive. Those buyers are putting such a price squeeze on me that I can no longer make out. I've got to find nonautomotive customers. But where are those that buy in the volume I need?"—Cleveland diecaster.

"The way things are working out, most of our customers just give us the work they can't handle in their own facilities. This problem of captive plants grows worse and worse." — Pittsburgh foundry.

"Captive shops? Sure, they're a problem. However, there's one even worse. Competing job shops are cutting prices like madmen. They must be losing money on every stamping they send out. They can't last, but as long as they do, they're raising hell."—Chicago stamper.

"We should have more business, but firms with captive shops are afraid to risk union displeasure by giving us work. We have one customer who slips jobs to us on the quiet, then picks them up in his car at night."—Philadelphia tool and die shop.

"Some 20 per cent of all hinges used in the U.S. are now imported, compared with 3 per cent only a decade ago. We just can't compete with foreign labor rates."—New England hardware manufacturer.

"Of some 6000 foundries in this country, 75 per cent are principally job shops. Yet they make only an estimated 55 per cent of all castings produced. In a nutshell, there's the major problem for all contract manufacturers."—Detroit foundry.

If those complaints are typical or just, Mr. Job Shop Operator, then metalworking is in for trouble. More than half of the 56,000 metalworking plants in the U.S. do some contract manufacturing. In some segments of metalworking, the percentage is even higher.

Boil down the complaints, and these stand out:

1. The low prices and low profits forced by powerful customers.
2. Price cutting.
3. Loss of business to captive plants.

What are contract manufacturers doing to help themselves? Here is what some are doing:

Low Profits

Ambrose E. Koch is president of Columbia Metal Stamping Co., a Cleveland job shop. Seventy-five per cent of its business is automotive. Mr. Koch says: "Of course, the automotive purchasing agents use sharp pencils. We try to have ours as sharp as possible, too, when we buy things. We expect to continue taking automotive business and to continue making a fair profit. We will do it by: 1. Quoting intelligently and quickly. 2. Knowing our costs. 3. Selling better through our agents. 4. Improving the quality of our personnel, including management men. 5. Improving our purchasing (often neglected in job shops). 6. Starting a program of regular equipment replacement because the major way open to cost cutting today is through improved manufacturing methods."

Ralph West, president of West Steel Castings Co., Cleveland, says: "Customers will pay premiums on parts that precisely meet their requirements. So, quality is a must for job shops, along with improved inspection techniques."

Comments a spokesman for M. P. Heinze Machine Co., Chicago,

Successful Job Shops Recommend:

Sell quality and sell it on the basis that quality in the long run means lower costs.

Know your costs and encourage competing job shops to know theirs.

Modernize your management; the one-man company is becoming extinct.

Take advantage of your natural advantages—quote fast, deliver promptly, give service, sell know-how.

maker of tools, dies, special machinery and heavy gage stampings: "We determine what fields we want to serve. We attribute our good volume to advertising our facilities and services, maintaining a sales force and keeping close contact with customers to determine their needs."

Price Cutting

Wellman Bronze & Aluminum Co., Cleveland, specializes in aluminum and magnesium castings, primarily for the aircraft industry. Points out Dan Wellman, president: "Our main problem currently is price cutting by other jobbing plants. We ignore it as much as possible because a lot of shops don't know their true costs. We can afford to ignore it by selling on quality, not price. Fortunately, quality, not price, is the first consideration in aircraft."

An official of Davis Larchmont Corp., Larchmont, N. Y., maker of screw machine products, agrees that price cutting by competing job shops is a major problem. He recommends a program to educate management on costs.

Comments Clement C. Caditz, president of Northern Metal Products Co., Franklin Park, Ill., producer of stampings: "The biggest economic opportunity for job shops is to know actual costs and to know that they are as low as, or lower than, any." Then, he implies, a company can safely ignore the price cutters, or, when the price cutting is in the form of claimed lower costs in the customer's facilities, a company can "question the validity of the cost figures which the buyer may be using as a basis for rejecting the job shop's bid." He advises: "Cost figures being used to reject bids are frequently not complete or accurately arrived at."

The Gray Iron Founders' Society, Cleveland, has just completed a survey that clearly shows price is not as important as many job shops think it is. Buyers ranked the factors that sell them in this order: 1. Quality. 2. Delivery and service. 3. Price. 4. Engineering aid. Price ranks only third among four categories!

Loss to Captives

"It's cheaper to buy milk than to keep a cow," says George F. Hutchins II, president of Standard Foundry Co., Worcester, Mass. He thinks that's the most effective argument in minimizing losses of business to captives.

"The competition with captive shops really isn't too much of a problem," believes L. A. Lindberg, president of Lindberg Steel Treating Co., Melrose Park, Ill. "That's due partly to the fact that job shops are specialists and that they usually know their costs better than captives."

A. Dudley Bach, president of New England Metallurgical Corp., with job shops in Boston, Worcester and Springfield, Mass., attributes many of the contract manufacturer's opportunities to technical know-how. "Many small or medium sized metalworking plants operate without or with only limited heat treating equipment," he points out.

H. A. Daschner, managing director of the Pressed Metal Institute, Cleveland, agrees that job shops which gain are those that have the best equipment and offer wider ranges of services. He says: "Captives need job shops and vice versa. There are some large runs of large stampings, such as floor, back and quarter panels, that should be made by the auto companies themselves. Some smaller specialties are best made by job shops, and the auto companies know it."

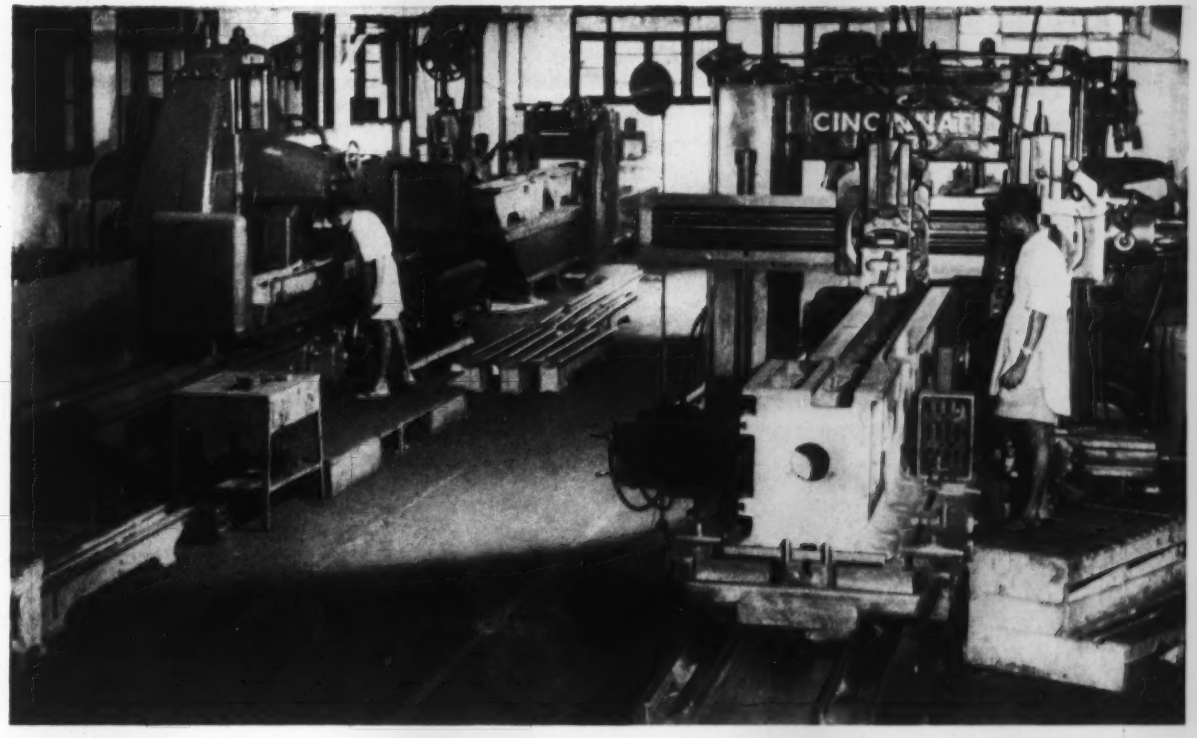
So, Mr. Job Shop Operator, the major problems (low profits, price cutting and captive competition) can be solved. Better knowledge of costs and improved quality are two solutions which will help solve all three difficulties.

Again and again, we hear these laments: 1. Too many job shops have weak management. They still try to be one-man shows when business has become too complicated for one head to know all the answers. 2. Too many job shops don't make their natural advantages pay off. They're small, so they should be able to make quick quotations, give personalized service and make money on small orders. They specialize in technical know-how, so they should be able to give engineering aid to help solve customers' problems.

Job shops have been called the enlisted men in the industrial army. When the morale of enlisted men gets down in a regular army, there's concern. We detected signs of slipping morale in the industrial army—hence, this letter.

Yours truly,
The Editors of STEEL

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Workers at Mysore Kirloskar, near Bangalore, are turning out engine lathes

India Seeks U.S. Tool Designs

Emissary from New Delhi looking for licenses for dozen different machine types. American designs to be used for equipment to be built by Asian nation

A DOZEN American machine tool builders soon may get a stake in India's struggle for industrial expansion.

India's second five-year plan (it started in April, 1956) calls for an increase of about 25 per cent in development expenditures. Both public and private sectors of the economy will benefit. An essential part of the program will involve the expansion and upgrading of the country's machine tool industry.

On Tour — John Elliott, an American serving as technical adviser to the government of India in New Delhi, is in this country discussing licensing with builders. He told STEEL that 12 licenses are sought—one for each of a dozen different machine types, including turret lathes, some milling machine sizes, radial drills, press brakes and shears, some gear generating equipment and several grinding machine types.

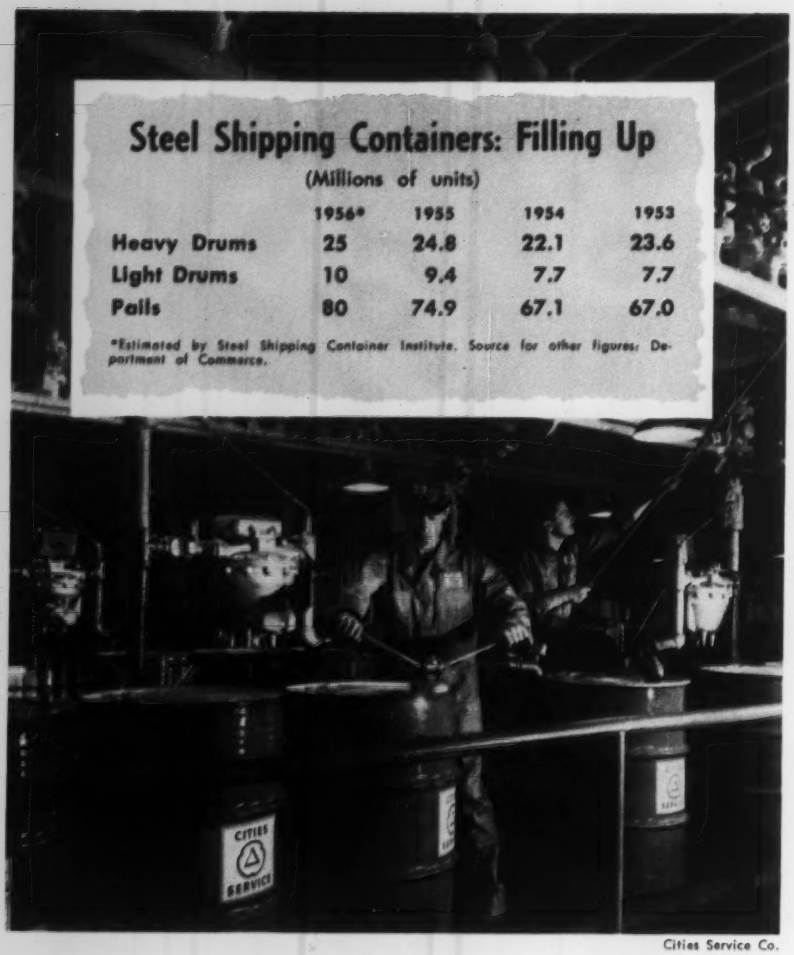
Licenses will be reviewed and approved by the Indian government, but each will be a private contract between the Indian and American builders. At first, Mr. Elliott explains, about 50 per cent of the machine parts will be imported by the Indian builder. Dependence on the American partner will gradually diminish until Indian companies can do all the building.

(Americans will get royalties on their designs.)

U.S. Interest—Mr. Elliott says he finds most U.S. builders are interested. The plan, he believes, will give them an opportunity to crack a tough market. Indian law prohibits the import of types built in India. The price on U.S. machines which qualify is usually out of reach of the potential purchaser.

Design Search — Licenses will make U.S. designs available to Indian builders. "Some of these companies," Mr. Elliott says, "have good equipment, new plants and skilled production and inspection personnel. What they need most is improved, up-to-date design for their products. They can save themselves a lot of time and engineering cost by arranging for use of American designs, which they prefer to those of most other countries."

The machines will be used in India's expanding metalworking industry which includes facilities to produce jet aircraft (both airframes and engines), four automobile plants, refrigerator and sewing machine (Singer) factories.



Steel Shipping Containers: Filling Up

(Millions of units)

	1956*	1955	1954	1953
Heavy Drums	25	24.8	22.1	23.6
Light Drums	10	9.4	7.7	7.7
Pails	80	74.9	67.1	67.0

*Estimated by Steel Shipping Container Institute. Source for other figures: Department of Commerce.

Cities Service Co.

Drums: Expansion Paradox

DRUM producers are moving to their markets. New plants are springing up in eastern and southern states, although over-all demand is well within limits of present capacity.

Two trends explain what is going on:

1. Consumers want to take advantage of new techniques in drum manufacture.

2. Market research studies show the need for new plants near growing customers, who benefit from low freight costs and prompt delivery.

Trend No. 1—Rheem Mfg. Co., New York, based expectations for a sales increase this year largely on the growing use of drums printed in as many as six colors. Customers are turning to color to add merchandising appeal to their products. Jones & Laughlin Steel Corp.'s Container Division plans some revision of its installations to take advantage of customers' desire for lithographed advertising messages.

Calig Steel Drum Co., Pittsburgh, is building a new plant in that city which will be in operation early in 1957.

Nesco Steel Barrel Co., Granite City, Ill., is revamping its Granite City line "to make it more efficient than ever."

Trend No. 2—Thomas M. Stinson, Nesco's president, adds: "We recently purchased a new building at Linden, N. J. The location makes it easier for us to render the quick service demanded by our drum customers."

The new Camden, N. J., plant of U.S. Steel Products Division, U.S. Steel Corp., can furnish 5.5 million drums and pails to petroleum, paint, chemical and food industries with major installations in that area. Before construction of the Camden plant, U.S. Steel filled eastern orders from the products division's Sharon, Pa., factory. Now Sharon can concentrate on serving industries in its area. Division officials explain that consuming industries want to receive containers at filling time—another reason for moving plants close to customers.

J&L opened two plants in new locations in the last two years. With factories built in Lancaster, Pa, and Port Arthur, Tex., J&L moved nearer to eastern industrial centers and southwestern oil, chemical and paint shippers.

Inland Steel Container Co. also moved to improve its geographical location when it took over production facilities of Cleveland Steel Barrel Co. in Cleveland and Greenville, O. Inland had no plants between Chicago and Jersey City, N. J., before the acquisition.

Warner & Swasey Expands

A program designed to boost production of machine tools 25 per cent has been started by Warner & Swasey Co., Cleveland.

A building, under construction at New Philadelphia, O., will contain 33,000 sq ft of manufacturing and storage space. It's expected to be ready in April, 1957. About 200 employees and 22 new machine tools will be needed.

Construction of a second addition to the company's New Philadelphia plant will start in a few weeks. Its main activity will be sheet metal work.

Connor Spring Enlarges

Floor space will be increased 25 per cent in Connor Spring Mfg. Co.'s expansion of its San Francisco plant. The company is adding several spring forming machines "to keep pace with the trend toward greater automation and ever-faster production."

Steel Files for More Tax Aid

But chances are against the government opening the door on all requests. Odds are that the five-year tax write-off will be allowed on plates, structurals and oil country goods

STEEL INDUSTRY applications for fast tax amortization are above the $1.8 billion mark. Twenty-one companies are on the bandwagon. The question now is: Will the Office of Defense Mobilization come out with a wide-open policy?

Prospects in general are still on the gloomy side, but the chances of applications involving hard-to-get items (such as plates, structurals and oil country goods) are better than they have been in several months. Such materials would be required for the talked about speed-up in tanker building and domestic oil production to give Western Europe a hand during the Suez crisis. A decision on these categories is expected before the end of the year.

Holding up any decision is the annual estimate by the Defense department on what its steel needs will be in the coming year.

(For a list of tax amortization applications filed prior to Oct. 19, see STEEL, Oct 22, p. 51.)

Rumor: A Montana Steel Mill

Central Montana may be the site of a $200-million steel plant, according to scuttlebutt heard on the West Coast. The sponsor, gossips contend, is a new firm, Montana Iron Mining.

Experienced steel men are reminded that in the last few years, four such reports about the northern California area alone have turned out to be duds. They are asking: "Where are they going to get the basic raw materials?"

Crucible Steel Adds Facilities

Twenty-five million dollars has been appropriated for new plant facilities by the directors of Crucible Steel Co. of America, Pittsburgh. Replacement and modernization projects are included.

These capital expenditures are in addition to a $20-million program now under way.

Joel Hunter, president of Crucible, explained: "There will be some increase in capacity, but the new program is aimed chiefly at cost reduction and quality improvement."

Directors also called a meeting of stockholders to act on the board's proposal to split outstanding stock two for one.

Bucyrus-Erie Builds

A $12-million plant which will make well drilling machines will be built near Richmond, Ind., by Bucyrus-Erie Co., South Milwaukee, Wis. It's scheduled to be completed by late 1957 or early 1958.

Products will include: Drilling machines for water wells and shallow oil wells and a jet piercing machine which makes blast holes in taconite and other hard materials.

The new plant will free space at the company's South Milwaukee and Evansville, Ind., plants for the expanded production of excavating machinery.

The Richmond plant will have 300,000 sq ft of floor space.

Steel's Tax-Am Requests Filed Since Oct. 19

DATE	COMPANY	AREA	TYPE FACILITY	ESTIMATED COST
10/19/56	Latrobe Steel Co.	Latrobe, Pa.	Blooming mill	$ 7,555,000
10/22/56	Colorado Fuel & Iron Corp.	Claymont, Del.	Blast furnace and auxiliaries	33,177,000
10/22/56	Phoenix Iron & Steel Co.	Phoenixville, Pa.	Blast furnace, coke ovens, beam mill, plate mill	134,255,000
10/23/56	Acme Steel Co.	Burnham, Ill.	Open hearth	15,421,000
10/24/56	Armco Steel Corp.	Butler, Pa.	Stainless sheets, strip	55,271,000
10/25/56	Great Lakes Steel Corp.	Zug Island, Mich.	Coke ovens, sintering	48,600,000
10/25/56	Great Lakes Steel Corp.	Zug Island, Mich.	Slabbing facilities	4,800,000
10/26/56	Colorado Fuel & Iron Corp.	Pueblo, Colo.	Open hearth addition	1,400,000
10/26/56	Colorado Fuel & Iron Corp.	Pueblo, Colo.	Open hearth addition	669,000
10/31/56	H. K. Porter Company Inc.	Huntington, W. Va.	Ingots, finishing	3,973,000
11/2/56	National Steel Co. (5 apps.)	Weirton, W. Va.	Pig iron, ingots	18,900,000

Burroughs Corp.

Small companies put electronic brains to use as . . .

Offices Go for Automation

WARNS Leon C. Guest Jr., controller, Sylvania Electric Products Co.: Unless the rate of office automation is accelerated, the time will come when clerical workers will be as hard to find as engineers.

Office operations, he says, have become less efficient and more costly in the face of steady gains in plant productivity. The ratio of clerks to factory workers is rising alarmingly: Fifteen years ago, 11 were required for every 100 manufacturing employees; today, 16 are needed. Another 15 years at that rate, and 24 clerks will be required to back up 100 men on the production line.

Optimism—Mr. Guest sees management coming to recognize these facts. Office machinery makers say new devices and refinements in equipment will speed the transition to automated offices. Although present methods of office procedure will not be completely obsoleted in the next decade, equipment makers are convinced great changes will be made. A big area for advancement: Office electronics are hardly over the threshold.

Sales of office machinery show the transition period. This year, sales will be up 20 per cent to a record $1560 million, one industry source estimates. The gain last year was almost as large. A smaller increase is expected next year, but automated equipment lines account for more sales.

Coming Up—Look for electronically operated inventory control charts; microfilm readers to give access to information in remote storage units; microfilm files with robot master microfilm units; TV telephones; photo facsimile transceivers (internal communications will be sent and received through a single device); electronic typewriters; atomic powered microphones to relay dictation to automatic typing machines.

Here Already—Electronic brains meet the day to day needs of smaller companies. All American Engineering Co., Wilmington, Del., reports excellent results with a Burroughs Corp. computer. When applied to an arresting gear problem, the machine did 96 hours of engineering computation in 65 minutes. If an engineer had done the job, notes Charles W. Wendt, All American's president, "his calculations would not have been so finely drawn or as accurate."

Sums up Mr. Wendt: "The computer can handle high volume calculations which have barred small companies from many areas of research and product development."

New Products—A file computer of intermediate size has been added to Remington Rand Division (Sperry Rand Corp.) electronic data processing systems. The machine combines advantages of high speed computers and self-activated record keeping systems, and can work with punched cards, punched paper tape, magnetic tape or a combination of the three.

International Business Machines Corp. has developed a disc memory unit for its random access memory accounting machine. It has a storage capacity of 5 million digits. Information is recorded on discs and is available at less than a second's notice.

Addressograph-Multigraph Corp. has some new features in its offset duplicating equipment, including an automatic blanket cleaner which removes the image in less than 5 seconds. Edison Voicewriter Division, Thomas A. Edison Co., has an electronic device which adds instant dictating service to

any telephone. The adding machine is being adapted by National Cash Register Co. for a major role in integrated data processing systems.

Big One—The typewriter, the number one item in the business machine field, is going electric fast. Electrics account for about 30 per cent of all sales, compared with 10 per cent in 1950. Smith-Corona Inc. has even brought out an electric portable.

The first application of electronics to a typewriter: IBM's electric typewriter with electronic tabulation.

And More — Pitney-Bowes Inc. markets a mailing machine which stuffs 90 envelopes a minute with four pages of printed matter. Swingline Inc. offers an electric stapling machine which will staple 40 sheets of paper at once.

New Deal in Electronic Cleaning

"We would rather get a small slice of a big market than a large slice of a small market," comments E. W. Meyers, president, Trion Inc., Pittsburgh: In return for a "know-how and royalty fee," Trion has granted Minneapolis-Honeywell Regulator Co. the right to copy and produce its electronic air cleaning equipment. Trion expects M-H to open up the whole air cleaning market through aggressive promotion (something Trion says it couldn't afford). M-H reportedly sees a $100-million market for electronic air cleaning in five years. Industry sales are now below $5 million annually. Trion expects its own sales to double next year.

The company has just announced price reductions ranging from $300 to $5000 on its line of equipment, following cost reductions in manufacture. Mr. Meyers says he can install an air cleaning unit in a seven-room house for about $430.

Odin Boosts Heater Division

Odin Stove Co., Erie, Pa., plans a $1-million expansion of its Republic Heater Division. Included is a large porcelain enameling plant which will make thermoglass boilers.

Experiment in Railroading

The Rock Island and ACF Industries develop Convert-a-Frate. The technique combines a small flatcar and containers that can be handled by a lift truck

ANOTHER RAILROAD with a new variation in equipment has joined the piggybacking ranks. The Rock Island Lines calls its new service "Convert-a-Frate."

A major problem in the piggybacking movement has been equipment and facilities—getting big truck trailers on and off conventional flatcars calls for special terminal facilities and ties down devices. The Rock Island believes it has the answer with a new container-type cargo unit and a new lightweight flatcar.

Shorty—Designed and built by ACF Industries Inc., the flatcar is only 38 ft long and weighs 26,600 lb, compared with the conventional 50-ft unit which weighs nearly 50,000 lb. The car features roller-bearing two-wheel trucks at each end, instead of the four-wheel trucks on conventional types.

Rock Island's cargo units, while not new in concept (see STEEL, Feb. 14, 1955, p. 38), do offer greater versatility because of a variety of sizes and styles. Also built by ACF, the cargo units are available is closed box type, open top gondolas, covered hopper, flat-bed pallet, tank and auto transport units. Basic dimensions of the units are 8 ft (wide) by 8 ft (high). They come in three lengths, 8, 17, and 35 ft. A refrigeration unit is available, too. It's a joint development of Rock Island and Minnesota Mining & Mfg. Co.

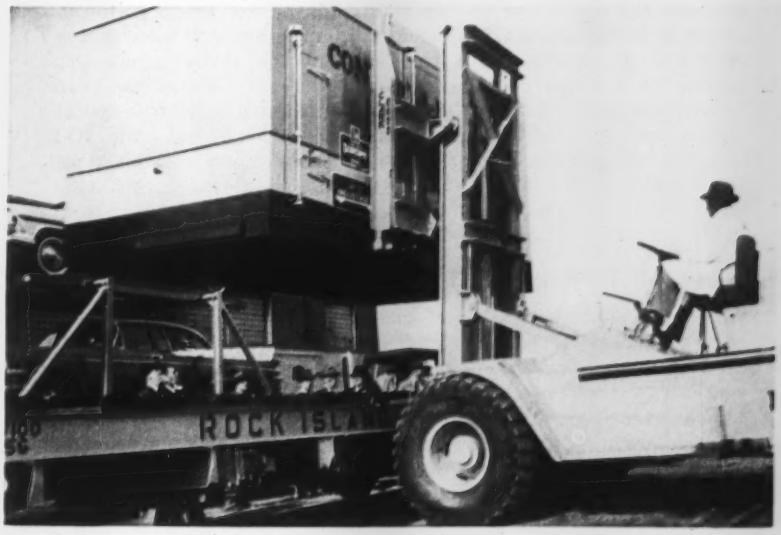
Fast Handling—Units are loaded and unloaded onto flatcars or trucks beds by fork lift trucks.

Many of the Rock Island's "Convert-a-Frate" shipments have been steel from Chicago and Granite City, Ill., to customers in Moline, Ill., and Wichita, Kans.

Chicago Area Expansion Rises

Investments in industrial plants in the Chicago metropolitan area during October amounted to $18,-208,000, bringing the cumulative total for the first ten months of this year, to $500,944,000.

The figure for the same period last year was $279,703,000, according to the Chicago Association of Commerce and Industry.



This refrigerator container is one of seven different cargo units on tap

Uncle Sam: Preoccupied With Europe's Oil Drouth

OIL will make business headlines as long as the Middle East crisis continues. Already under way is a speed-up in U.S. production to help meet the needs of Western Europe whose industry is heavily dependent on oil imports. Also indicated is an increase in exploration work to find new reserves in this country. First to feel the effect in metalworking: Oil country goods.

Because of Oil: West European Slump?

A much broader implication, and one already causing head shaking among top government officials, is the possibility of a sharp economic slump in Western Europe because of the oil shortage. Those officials point out experiences that show business declines in Western Europe are soon reflected in the U.S. and Canada. With the administration's much prized balanced budget greatly dependent on high business activity (and accompanying high tax returns), watch for action to get Europe the oil it needs. A tanker program is being studied. Another problem could be a dollar shortage; some solution to that might be found on the basis that Western Europe is vital to our defense.

ICC Delays Hearings on Freight Rates

The Interstate Commerce Commission has again postponed the deadline for opponents of the railroad-proposed 15 per cent increase in freight rates. Statements in opposition may now be filed until Feb. 1—previous date was Dec. 24. The railroads are also asking for a 7 per cent "emergency" increase. There has been some doubt about whether the railroads want a total increase of 22 per cent, or if the 7 per cent is included in the 15 per cent. ICC says the petitions are ambiguous. It takes the second meaning. Railroads will amend their requests; they want the 22 per cent boost.

Brownell To Study U.S.-Backed Research

Watch for an investigation of government-backed research. Attorney General Herbert Brownell has charged: "The total effect of the research and development effort may well tend to increase concentration of economic power." So he wants to find out if big companies are growing bigger by using patents developed under federal research grants. Suggested solution: The government would pay the total cost of the research and take title to any resulting patents. Possible side issues: 1. The high cost of preparing bids and inadequate capital reserves keep small firms out of such work. 2. Need for a list of qualified small research firms.

Squabble Resolved?

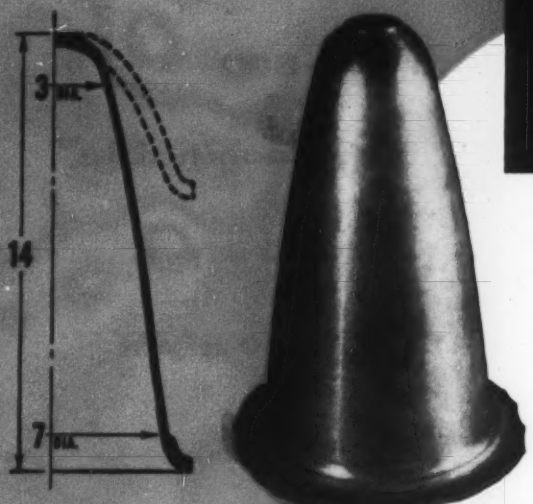
Higher ups at the Pentagon have tentatively resolved the Army-Air Force squabble over aircraft and guided missiles. The Army will continue to be limited to small aircraft for combat zone operations and to (relatively) short range antiaircraft and ground-to-ground missiles. The Air Force appears to come out the winner. It keeps its job of airlifting, takes over full responsibility for shore-based intermediate range ballistic missiles and holds on to the intercontinental missile. It also keeps responsibility for certain antiaircraft defenses.

Straws in the Wind

- Watch for a look-see at the highway program soon after Congress comes back. The entire road show will be in the spotlight, but sharpest focus will be on shortages of steel and engineers.
- On engineers: The Bureau of Mines has opened an "emergency recruitment" campaign to get them and scientists for stepped-up minerals research essential to industry and defense. Increased starting pay, higher grading and recently liberalized fringe benefits are pointed to as inducements.
- Applications for small business loans hit an all-time high of 692 in October. Loan approvals by the Small Business Administration were second highest on record, 323. More than $215 million in government buying was set aside for small business during July-October, an increase of $91 million over the same period last year.
- The Air Force has its first turboprop transport, the Lockheed C-130 Hercules. AF buying of piston-engine aircraft reportedly is stopped.
- Another hearing on the defense essentials of the domestic watch industry will be held Jan. 7—this one by ODM.
- The Commerce department is putting Hoover Commission recommendations in effect in five areas of its activities.

HEMISPHERES TO 38" DIAMETER,

with 3/8" max. wall thickness, are readily formed on the Cincinnati Hydrospin. Part wall can be tapered or have constant thickness. The starting blank is a flat disk or dished preform. Almost any ductile metal can be used. Other machines available for parts and hemispheres larger than 38".



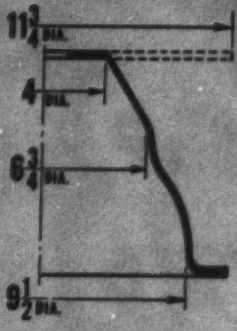
complicated contours cost less by Hydrospinning!

The parts shown here were formed by *tracer* Hydrospinning at substantial reduction in cost over that of previous production methods. These parts were produced in far less time . . . are more accurate . . . have increased strength with greater resistance to fatigue failure . . . required less material . . . and were made without compromising on material requirements.

If difficult-to-form contoured components are one of your production headaches, get the facts on Hydrospinning. Call in a Cincinnati Milling field engineer. For a detailed description of the process and machine specifications, write for new Bulletin M-1873-2.

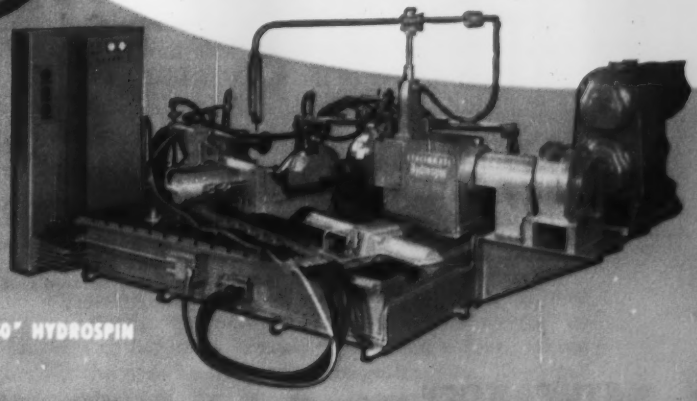
PARABOLIC-SHAPED PART

formed in one pass in two minutes. Starting blank of 61 SO aluminum, 11 3/8" dia. x 3/16" thick, was preformed on a Cincinnati Hydroform.



COMPOUND CONTOURS

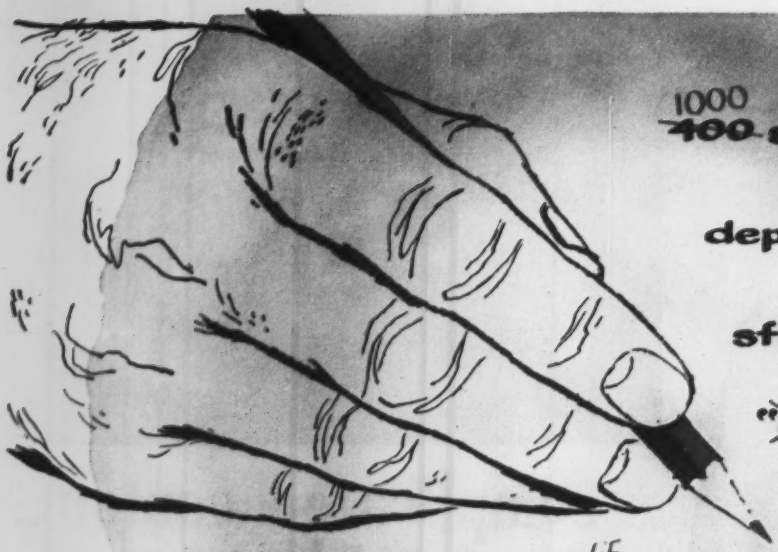
of this part were formed in one pass in one minute. Material is mild steel.



CINCINNATI 42" x 50" HYDROSPIN

CINCINNATI **Hydrospin**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.



1000
~~400~~ sfpm

depth of cut-.125 ~~.005~~

1250
sfpm-~~800~~

"~~un~~machinable"

2000
~~250~~ sfpm

65
pieces per hr.-~~20~~

1175
SAE 1035-~~250~~ sfpm

505
HS-Steel-~~90~~ sfpm

4
min. per cut-~~40~~

you can scrap your ideas of cutting-tool performance . . .

STUPALOX

introduces a NEW ERA!

The figures above show the amazing improvements in production obtained through the use of STUPALOX sintered oxide cutting tools in place of tools previously used. Actually the figures are conservative, because tool performance in many cases was limited by inadequate power and rigidity of the machine tool.

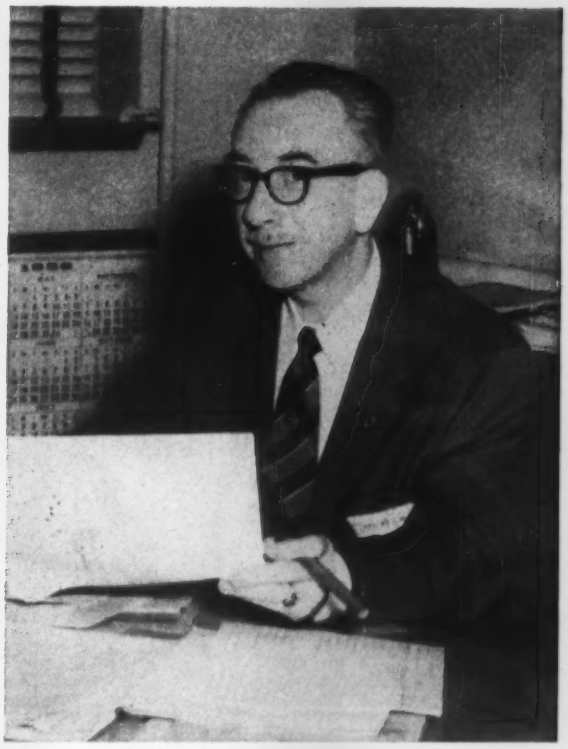
Stupalox Tools are available now in commercial quantities, and a variety of styles and sizes of inserts. Write for complete data.

HANDY PACKAGE — *contains ten inserts*

This compact plastic box provides a practical container for ten Stupalox sintered oxide inserts.

STUPAKOFF DIVISION OF **The CARBORUNDUM Compan**

WRITE DEPT. S LATROBE, PENNSYLVANIA



De Mause: Administrative Engineer

EVER SEE an administrative engineer in action? He's the man who has to keep tab on everything that happens in his bailiwick. Chances are you'd rather see than be one, unless you're like Leon De Mause who holds the title in the engineering department of GM's Cadillac Motor Car division.

"I handle everything from budgets and cost control to hiring, firing and development follow-up," says Mr. De Mause. He points out the job evolved because of the type of organization Cadillac engineering has developed.

Separate and Equal—"In the early '30s at Cadillac, the engineers in charge of the engine, transmission, electrical components, chassis and the body all had their own little design sections, their own laboratory specialists, their own clerical staffs and their own drawing files," explains Mr. De Mause. One engineer, he recalls, even wanted his own blueprint machine.

This setup obviously wasted a lot of valuable manpower—and money. Cadillac switched to its present system in the late 1930s. "The major sections of the car are set up in five departments, each under its own staff design engineer," he explains.

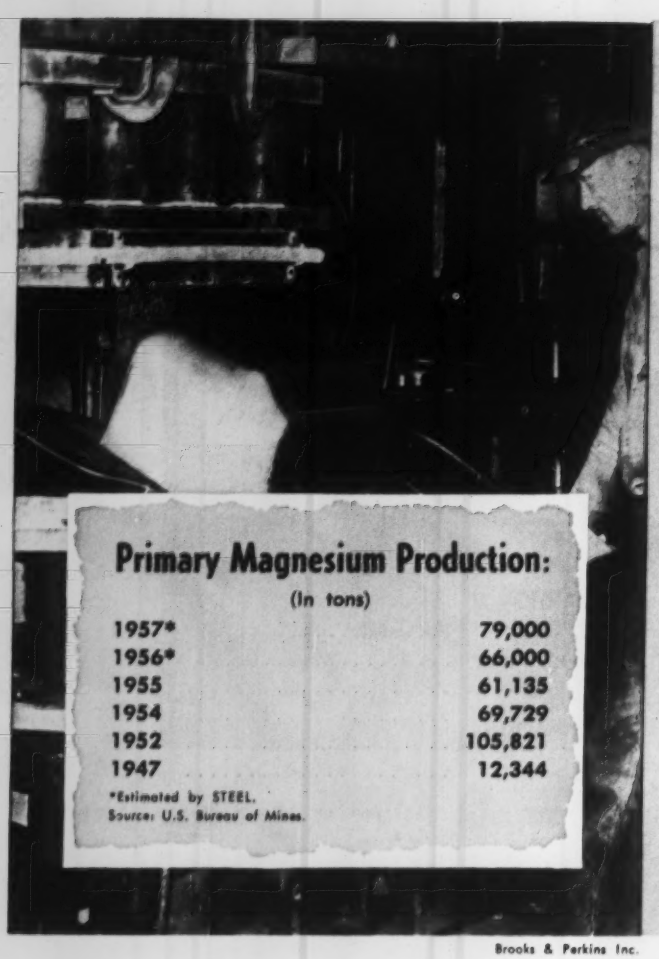
Heads of service groups, such as drafting, test and development, wood and metalworking, specification, procurement and budget control, report directly to Mr. De Mause. He runs interference between staff design and project engineers who want parts or blueprints and the service groups which furnish them. "That's the kind of co-ordination an administrative engineer has to do," he reports.

Advantages—"This organization isn't unusual today. Most auto divisions in the industry make use of an administrative engineer by one title or another," says Mr. De Mause. The setup saves manpower, lets engineers do engineering. Technical people can carry out the detail work.

Full Staff—"There's no shortage of engineers at Cadillac. We don't want to get so many they can't develop properly," says Mr. De Mause. The ratio of technicians to engineers is about 2 to 1. That's comforting news in this era of shortages.

Mr. De Mause also finds the engineer-technician team tends to break up little cliques among engineers. Engineering neophytes at Cadillac work in each department before picking the area they want to concentrate in. They get plenty of responsibility—and technicians to help.

Background—Mr. De Mause, who turned 47 last June, came to Cadillac in 1930 after short stints at Ford Motor Co., King Seeley Corp., Ann Arbor, Mich., and GM Research. He has held his present post since 1950.



Primary Magnesium Production:

(In tons)

1957*	79,000
1956*	66,000
1955	61,135
1954	69,729
1952	105,821
1947	12,344

*Estimated by STEEL.
Source: U.S. Bureau of Mines.

Brooks & Perkins Inc.

Some Growing Uses for Magnesium

Sheets

Aircraft, helicopter, missile and electronic components, truck bodies, luggage.

Extrusions

Aircraft, radar and missile components, helicopter airframes, truck body side and corner posts, dock boards, material handling equipment, automotive parts, ladders, tools, anodes.

Plates

Jigs, fixtures, dies, dock board flooring, photoengraving and printing plates.

Diecastings

Automotive parts, electric motors, power tools.

Sand Castings

Aircraft, helicopter and missile structural parts, power tools, pedestals and supports for radar equipment.

Permanent Mold Castings

Cast anodes for cathodic protection of ship hulls, cargo ballast tanks, pipelines and underground or submerged steel structures; tools and machinery.

Forgings

Aircraft wheels, engine parts, helicopter structural components, electronic equipment, portable radar antennas.

Magnesium Catching On

DESIGNERS are beginning to show more interest in magnesium. Commercial applications are growing. Military demand is expanding.

Market Development—Air-borne equipment makers are turning to the metal. Dennis E. Harvey, vice president, Magnesium Co. of America, East Chicago, Ind., explains: "We expect an even greater emphasis on the use of magnesium for air-borne equipment during 1957. The trend was especially noticeable this year." Mr. Harvey also points out that in the consumer fields there is a growing demand for lightweight components. It is caused in part by the rapid rise of transport and handling costs.

Aircraft—Besides its use as a structural component, magnesium is being accepted by aircraft companies as a metal for tools, jigs and fixtures. Such applications are expected to grow a lot in 1957. Explains Dow Chemical Co., Midland, Mich.: "While magnesium tooling plate is a relatively new material to the aircraft industry, six major planemakers have already adopted it. Others are evaluating it."

The introduction of the magnesium-thorium alloy (HK31), which is resistant to the higher temperatures developed by air friction and supersonic speeds, should help expand aircraft markets. The need for light parts will add additional impetus. Example: A major factor in the selection of magnesium for the propeller spinners on the new Lockheed Electra was its lightness.

Detroit — Motordom is experimenting. A thumbnail sketch of where magnesium is being used shows:

Buick: Fan spacers.

Chevrolet: Oil filter by-pass valve.

Chrysler: Heater and defroster louvers.

Ford: Fan spacers.

Lincoln: Steering column shroud, shift bowl, cover plate and oil reservoir cover.

Oldsmobile: Clock housing, steering column.

Plymouth: Steering column.

Printing — Brooks & Perkins Inc., Detroit, reports demand for magnesium printing plate is some 20 per cent above that in 1955. Another 20 per cent gain is looked

for in 1957. And the packaging industry is interested in chrome plated magnesium printing plates for long run rotary press work.

Anodes—George Kurr, cathodic protection sales manager, American Smelting & Refining Co., New York, reports: "Rapid growth of the marine market is the largest single factor helping to increase anode sales. The market for magnesium anodes in the pipeline industry has shown continued, though unspectacular gains." Dow estimates its anode sales will show a 17 per cent increase over its 1955 totals. Anode sales may jump another 21 per cent next year, predicts Dow.

Alloying — The magnesium industry has a stake in the future of aluminum, too. Industry observers estimate that more than 15,000 tons of magnesium will be used to alloy aluminum this year.

Primary—Production this year, hampered by a strike during July, will reach about 68,000 tons (see table). Industry capacity is 75,000 tons. Two electrolytic plants (one owned by Dow, the other leased from the U.S. by Dow) at Freeport and Velasco, Tex., supply domestic needs.

More Metal — As demand increases, Dow should be able to up its capacity to about 82,500 tons by adding more power to its pot lines. Brooks & Perkins will become the nation's second producer by the end of next year. Its subsidiary, Alabama Metallurgical Corp., will produce some 10,000 tons annually. It will use the ferrosilicon process.

Explains B&P: "The major advantage of producing magnesium this way is that it is of higher purity . . . While this is not important in many applications, we find that the purer product is much better for use in the production of printing plates. It is a must when magnesium is used for the reduction of uranium and zirconium."

Thorns — This maturing industry still has problems. It needs more suppliers of primary metal to assure possible large users of adequate supplies. Motordom may be hesitating because of this. The hot chamber die-casting process is still not competitive in most applications. It is evident that more progress needs to be made in cold chamber die-casting methods.

But—D. T. Wellman, president, Magnesium Association and Wellman Bronze & Aluminum Co., Cleveland, sums up the industry's outlook: "Everyone in the magnesium business is most optimistic."

DoAll Speeds Up

Illinois firm solved its delivery problems by setting up a traffic control system

BUILDING customer service is a fertile area in which traffic managers can exercise their ingenuity.

Full Speed—With over 15,000 cataloged cutting tool and gage items, DoAll Co., Des Plaines, Ill., has 35 sales service stores in the U.S., whose inventories take care of 90 per cent of their day-to-day business.

"This wasn't good enough," says Vincent Sweeney, traffic manager. "We had to have a fast method for getting the other 10 per cent from our warehouse to the customer."

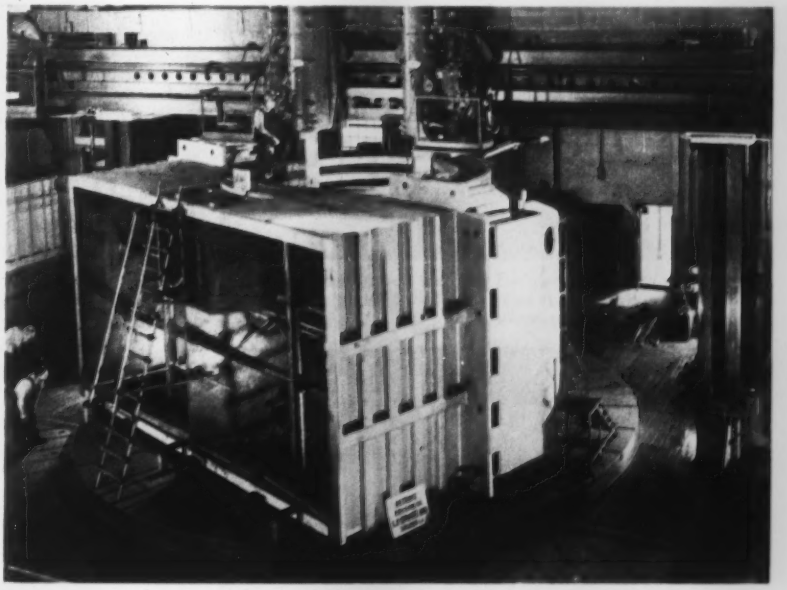
Solution—Three phases of control were set up: 1. Each store periodically reviews its inventory so that fast-moving items are kept in ample supply and slow-moving items are returned to the warehouse. 2. A teletype network speeds up the processing of orders for items not in stock. 3. Experience with parcel post and express showed deliveries to distant points often took five days or more.

For its east and west coast service, DoAll chose United Parcel Service, which flies consolidated shipments from Chicago to coastal points, then delivers by truck. For midwestern, southern and southeastern points, Greyhound Bus offered delivery time advantages.

Meaning—The three phases of the program add up to this delivery schedule: East and west coast stores can order items from the central warehouse one day and get delivery the next. Stores served by Greyhound get first morning delivery in Texas and second morning delivery in New York and the Southeast.

Du Pont Boosts Acid Output

The Grasselli Chemicals Department of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., is producing sulphuric acid at a new plant near Columbia Park, O.



Boring Mill Machines 300,000-KW Turbine-Generator

Allis-Chalmers Mfg. Co., Milwaukee, uses this 40-ft boring mill to machine a 150-ton section of a steam turbine-generator for Detroit Edison Co.'s River Rouge station. The turntable of the 500-ton machine tool moves about one-half revolution a minute as it bores cylinder ring joints in the turbine casing

How Great Lakes Steel *charts* quality

Left: Thermocouple is inserted into an open-hearth furnace to check temperature of heat. Right: Multiple indicator records open-hearth temperature.

This view shows 12 of Great Lakes 17 open-hearth furnaces. Bright spots are furnaces being charged with pig iron and scrap. The open-hearth process takes from 10 to 12 hours.

This is the business end of a thermocouple, the rugged yet delicately accurate device that measures temperature in an open-hearth furnace. The two fine wires you see above, inside the casing, absorb heat and transmit it as an electrical current to be charted by recording potentiometers.

No chance for guesswork here—through eleven long hours the rising temperature of what will be 500 tons of Great Lakes open-hearth steel is meticulously controlled. Then, at exactly the right time and the right temperature, the glowing molten metal gushes into ladles for pouring into ingots.

The slender, spidery lines on the chart assure another heat of high and uniform quality steel. Quality that is checked and rechecked at every step to assure that customer specifications are met precisely.

Why don't we get together and talk over your steel needs? Some time soon?

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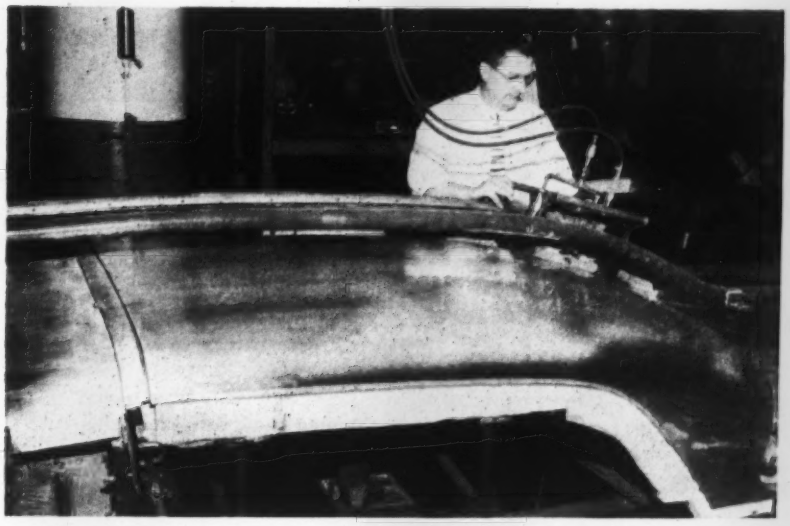

Here's final brushing for roof on . . .

Cadillac's luxurious Eldorado brougham as . . .

Stainless Goes to the Top

THE SEAMS don't show, but Cadillac's Eldorado brougham has a three-piece stainless steel top.

The brougham has been in Cadillac's show car stable for over a year. Now it's coming out as a production model. Fabrication of the 50-lb top is an example of what the General Motors Corp. division is doing to make the brougham the last word in elegance.

Specs—Tops are stamped out in GM's Fisher Body plant 37, Detroit. Each one is made from a 72 x 76-in. sheet of stainless steel which is 0.041-in. thick (AISI 18-8). A single draw forms the major roof section. Two restrikes finish the beads around forward and trailing edges where the backlight and windshield glass are installed.

In a separate operation, two stainless extensions (ears) are stamped out. They are welded to the rest of the roof at Fisher Body plant 21. Since the top has a brushed finish—no paint or lacquer—all traces of the weld joint must be concealed.

Form Fit—R. F. Berford, production engineer, plant 21, says welding isn't a difficult problem. "It just takes a lot of time and manpower," he explains. Each extension is filed and fitted to a roof panel. Joints must be perfect and nonstainless metals must be kept out of the weld to avoid rust streaks after the top is finished.

The three sections are placed in a welding fixture and Heliarc welded from the inside. "We use a tungsten electrode and regular stainless rods for the weld. We're getting 100 per cent penetration and no pits," Mr. Berford reports.

Skinned — After welding, the bead is filed off by hand. The roof then goes to a 29-ft belt sander which skins off orange peel bumps and imperfections. This operation has been done by hand, but Mr. Berford feels the sander will do the job faster and just as well.

Finish brushing is the last step. The tops are placed in a buck which hand indexes in 2.5 in. increments. An operator moves an air powered Jitterbug sander (Sundstrand Machine Tool Co., Rockford, Ill.) over the top. The Jitterbug rides in a parallel jig. It has two 3 x 5.5 in. pads covered with aluminum oxide abrasive cloth which do the final brushing.

Straight Lined—Since all brush marks must be parallel to the center line of the body, an extension jig, which is fastened to the fixture, swings up so the operator can finish the ears by hand.

Completed tops are spotwelded to the body by conventional methods. A standard type drip rail covers the joint. Mr. Berford reports no difficulty with this process. Result to the viewer: A one piece top. Cadillac defies the owner to spot the weld.

Although fabrication sounds simple, Mr. Berford admits a lot of problems had to be worked out. Cadillac has about 50 tops on hand now. Rejects are few. One reason

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is that each top is covered with a glass fiber shell to protect it from bumps and knocks during finishing.

Luxury—Details of the handwork involved in building the roof are typical of the care Cadillac is taking to put the brougham in a class by itself. Unlike Ford, which styled the Continental Mark II in a completely different manner to avoid resemblance to other lines, the brougham retains its distinct Cadillac identity.

The car is built on a 126-in. wheelbase. The standard wheelbase for '57 Cadillacs is 129.5 in. It does use the same tubular X-frame construction as other division cars. But the body is fastened on outriggers rather than side rails. This makes for a lower silhouette.

The brougham is 55.5 in. high, compared with the 59.1 in. 62 Sedan and 60 Special.

Air Ride—The brougham also is the first of the GM's cars to use individual air suspension units at each wheel. Leveliser valves and an air compressor keep the car level no matter how heavy the load gets. Front suspension is a variation of the ball-joint system. Joints are spherical. They aid in nose dive control at stoplights.

Since the car is styled for luxury, there are plenty of gadgets to make driving easier. Besides power seats, windows, steering and brakes, the brougham has electrical door locks which can be controlled from the driver's seat. Dual headlights are standard. The transistor radio has an automatically operated antenna which goes up when the radio is turned on and slides into a recess when the set is off.

To Be or Not—The power plant for the brougham is a standard Cadillac Eldorado engine with 10:1 compression ratio. It turns out 325 hp. Fuel feed is from a dual, 4-barrelled carburetor setup. Dopesters have said that a fuel injection system would be standard. Now some sources are betting it will come as a running change later in the year.

Price and production quotas haven't been released, but J. M. Roche, general sales manager of the division, reported earlier that maximum output in 1957 will be 1500 or less. The price has been pegged at $12,500, but more recent information indicates the brougham will be going initially for a good bit more—possibly $13,500 to $14,000.

Ford Uses Ceramics

Ceramics are prolonging tool life and reducing tool change time at Ford Motor Co.'s standard transmission and radiator plant, Dearborn, Mich.

Ford is using the tools to machine sliding gears for transmissions.

General Electric Co.'s Metallurgical Products Department, Detroit, is furnishing the ceramic material which it calls cemented oxide.

Cutting speed has jumped from 450 to 970 sfpm. Tools are changed at intervals of 8 to 16 hours and produce an average of 1600 cuts per tool edge. Machine down time has been cut from 4.16 to 1.87 hours per month.

The Ford job consists of finish turning, grooving and facing the low and reverse sliding gear on a standard automatic lathe. Five throwaway cutting tips are used. Three are ceramic, and two are carbide. The gear itself is forged from 5135 steel. Ford reports it gets a consistent finish with Profilometer readings of 85 rms. No coolants are used on the work.

U.S. Auto Output

	Passenger Only	
	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,996	614,493
September	190,709	461,591
October	388,922†	517,813
10 Mo. Total	4,622,918†	6,510,814
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Oct. 27	104,269	158,430
Nov. 3	117,583	167,278
Nov. 10	132,087	180,754
Nov. 17	135,641	179,250
Nov. 24	123,146†	151,799
Dec. 1	145,000*	177,712

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

AMC Sales Pick Up

Sales of Nash, Hudson and Rambler cars are higher than the pessimistic auto industry anticipated a month ago. Roy Abernathy, AMC vice president of marketing and distribution, reports sales in the first ten days of November totaled 3372 units—48.9 per cent higher than in the same period last year.

When the lines were introduced in October, talk about town took the attitude the cars hadn't been changed enough to place the smaller auto maker in a strong sales position.

While it's still too early to call the sales surge a trend, it's worth watching. If AMC can stage a comeback (on the Rambler in particular), it eventually could result in a slowdown in the current campaign to make cars longer each year.

Exhaust Notes

• Chevrolet Division of General Motors reports it uses 20,450 tons of sheet and strip steel monthly in its frame and stamping plant at Flint, Mich. The division also says it buys parts from 23,777 prime suppliers. Edward N. Cole, general manager, observes that nine out of ten of these suppliers employ under 500 persons. Slightly more than half employ less than 100 workers.

• Mercury Division, Ford Motor Co., announces its dealers closed sales for more than 10,000 cars the first day new models came on the market. F. C. Reith, general manager, says the division has enough orders to keep Mercury plants operating at capacity for the next three months.

• Owners of Volkswagens who are weary of explaining the merits of their scuttlebugs can take a tip from a Detroit owner. A sign on his windshield explains: "Made in der Black Forest by elfs."

• The Automobile Club of Michigan reminds 1957 car owners they'll have to change the size of snow chains to fit 14-in. wheels.

PRODUCTION SHORT CUTS WITH

ZINC
DIE CASTINGS

NUMBER 5 OF A SERIES

▲ Assembly is a simple job with two mounting brackets and dust shield pre-assembled. The ZINC Die Casting becomes a structural member of the cabinet and supports the front glass and tuning controls.

◀ This ZINC Die Casting, designed by Westinghouse for its 1957 line of TV receivers, requires no secondary operations other than a baked electrostatic spray finish. The name and indicator arrow are cast into the frame.

Framing the picture at WESTINGHOUSE

At WESTINGHOUSE, TV designers recognize that *appearance* and *production cost* are just as important as maximum performance to the success of a new line of receivers. To get the utmost in eye-appeal and production economy in the 1957 models, WESTINGHOUSE combined the outer screen frame and the cabinet front in a beautifully designed, one-piece ZINC Die Casting.

How else could the front panel and screen mask be produced complete with mounting studs accurately cast for quick assembly?

How else could the necessary control openings and parts recesses be provided without expensive machining?

How else could you secure a part having more than adequate structural rigidity at a great saving in cost?

What other metal or process could excel ZINC Die Casting in attaining such a clean, satin-smooth finish?

These basic qualities account for the widespread use of ZINC Die Castings in many fields—uses which result in production short cuts to more durable and handsome products. For possible answers to *your* manufacturing design problems, send for our brochure and contact any commercial die casting company.

◀ **Send for your copy.**

The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

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FOR DIE CASTING ALLOYS

The research was done and the Zamak die casting alloys were developed with

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

"Bolt" problems . . . two kinds

A LIGHTNING BOLT flashes from angry skies. What happens to electrical service? Nothing. This is one kind of "bolt" problem the electrical industry has learned to cope with.

But how about the mechanical kind of bolt used to connect electrical lines and equipment? They have to be strong and flawless, these fasteners . . . and completely reliable . . . to maintain service under all conditions.

There's a good answer now to that too: *Silicon bronze* fasteners . . . *strongest* of all highly conductive fasteners. RB&W was first to work this material successfully into standard fasteners.

RB&W—A MAJOR SUPPLIER TO INDUSTRY

A leader in its field for over 111 years, RB&W turns out the finest quality standard fasteners for the electrical as for virtually all major manufacturing industries. *Modern facilities, new techniques, long experience* . . . all combine to make RB&W fasteners truly the "strong point of any assembly."

CALL IN THE RB&W "FASTENER MAN"

Impressive savings can be realized on fastener costs by proper application. It might pay you well to have the RB&W "Fastener Man" take a good look at *your* requirements.

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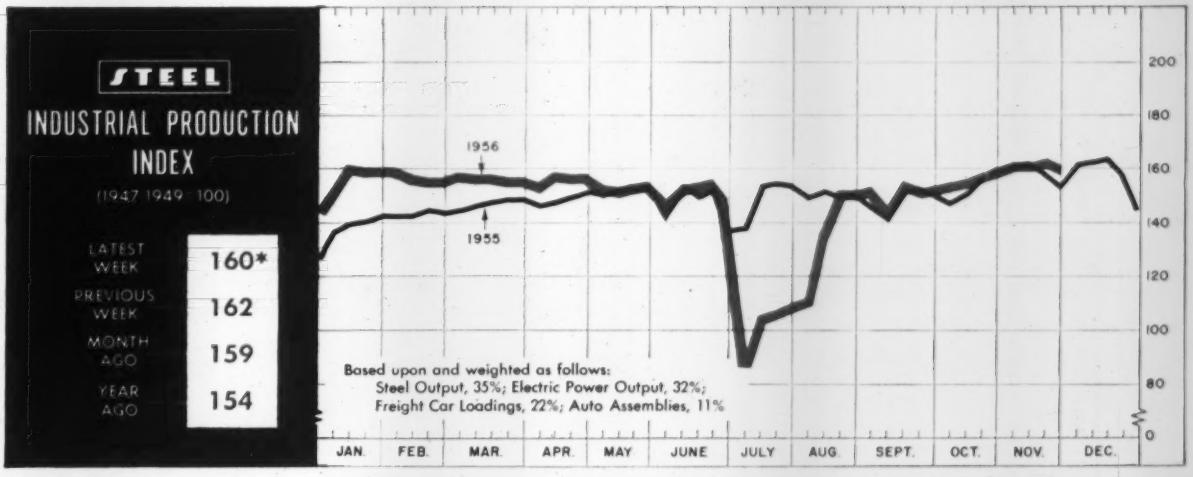
Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver. **Distributors from coast to coast.**

RB&W FASTENERS - *Strong Point of any assembly*



*Week ended Nov. 24

Metalworking Keeps U.S. Production High

METALWORKING activity is at the highest level in the history of the industry, and it still is building up to its peak. This trend alone is a practical guarantee that industrial production records are in the offing.

This year, metalworking sales will total $135 billion—a downward revision from earlier figures because of the steel strike and a sluggish auto market during most of 1956. The figure would have been lower had it not been for the tremendous upsurge in machinery sales and production. But even at $135 billion, metalworking accounts for a shade under one-third of this year's gross national product of about $411 billion, so what happens in this largest of all industries goes a long way in determining what happens to the overall economy.

What's Happening?—Latest report from the Federal Reserve Board places industrial production at a record 145 per cent of the 1947-1949 base period. The biggest factor in setting this record has been the strength of metal fabricating, which reached 178 per cent of the base in October after setting a record of 176 in September. Machinery, both electrical and nonelectrical, is the potent factor in this uptrend, with an assist from instruments.

There has been no break in the demand for heavy machinery, but there has been a significant upsurge in overtime activity in Detroit and other auto making centers. The FRB's index for automobiles in October, 1955, registered a lofty 194, compared with 118 this October. Motordom is shooting for that level again and will make it by January.

Singlehanded—Short term gains in production will be almost the direct result of motordom alone. With few exceptions, the other segments of the metalworking industry are operating nearly at maximum levels. Because expansion comes slowly, about the only way additional output can be obtained is through overtime

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,469	2,463	2,356
Electric Power Distributed (million kw-hr)	11,600[1]	11,589	10,727
Bituminous Coal Output (1000 tons)	10,415[1]	10,165	10,486
Petroleum Production (daily avg—1000 bbl)	7,150[1]	7,159	6,859
Construction Volume (*ENR*—millions)	$357.6	$369.9	$305.5
Auto, Truck Output, U. S., Canada (*Ward's*)	151,451[1]	167,410	181,089
TRADE			
Freight Car Loadings (1000 cars)	765[1]	763	677
Business Failures (Dun & Bradstreet)	240	219	214
Currency in Circulation (millions)[3]	$31,269	$31,141	$30,824
Dept. Store Sales (changes from year ago)[3]	+7%	−3%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,601	$19,638	$23,173
Federal Gross Debt (billions)	$276.7	$275.0	$279.8
Bond Volume, NYSE (millions)	$23.5	$24.1	$17.2
Stocks Sales, NYSE (thousands of shares)	9,002	10,044	8,977
Loans and Investments (billions)[4]	$85.6	$85.6	$85.8
U. S. Govt. Obligations Held (billions)[4]	$25.6	$25.8	$30.4
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	208.90
STEEL's Nonferrous Metal Price Index[6]	256.8	257.0	265.2
All Commodities[7]	115.6[1]	115.6	111.1
Commodities Other Than Farm & Foods[7]	123.9[1]	123.9	119.2

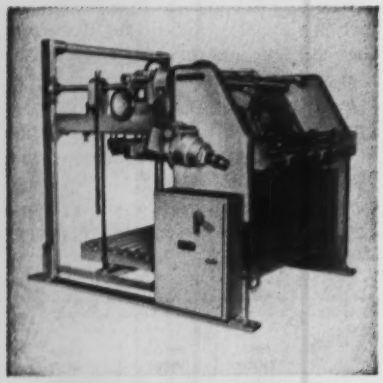
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,895; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

DEXTER
AUTOMATIC METAL SHEET FEEDER

Metal sheets, automatically separated, picked up and advanced one at a time to feeding—in point of machine to which it is attached at speeds up to 150 sheets per minute.

Should two sheets adhere, they are automatically transferred to a reject tray. Rubber suction mouthpieces and drop rollers prevent scratching.

Standard Feeder handles metal sheets from 14" x 18" up to 36" x 44" between 24 and 38 gauge stock. Feeders for larger size and heavier gauge metal sheets also available.



Continuous reloading avoids machine stoppage. New loads are placed in feeding position, while machine is operating, thus maintaining continuous automation cycle.

Dexter Feeder may be attached to Metal Litho Presses, Coating Machines, Sorting Machines, Shears, Slitters, Sprayers, Punch Presses, Stove Pipe Machines, Buffers and numerous other metal working machines.

Custom built sheet feeders for handling paper, cardboard, corrugated and other types of sheets are available to meet specific requirements. Inquiries invited.

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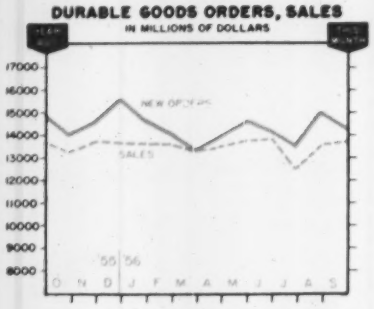
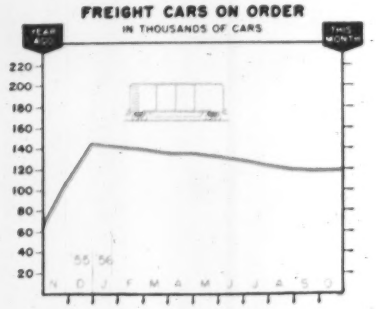
THE BUSINESS TREND



	New Orders*		Sales*	
	1956	1955	1956	1955
Jan.	14,683	12,142	13,595	11,850
Feb.	14,107	12,170	13,593	12,029
Mar.	13,337	13,353	13,294	12,860
Apr.	14,073	12,879	13,519	12,805
May	14,732	14,331	13,754	13,322
June	14,185	14,033	13,850	13,527
July	13,513	13,571	12,627	13,503
Aug.	15,166	15,145	13,665	13,745
Sept.	14,377†	14,936	13,730†	13,692
Oct.	.....	14,094	.....	13,261
Nov.	.....	14,680	.....	13,721
Dec.	.....	15,605	.....	13,688

*Seasonally adjusted. †Preliminary.
U.S. Office of Business Economics.
Charts copyright, 1956, STEEL.



	Awards		Backlog (end of month)	
	1956	1955	1956	1955
Jan.	1,818	5,087	144,946	18,395
Feb.	1,675	2,690	141,437	18,633
Mar.	1,618	2,156	137,070	17,974
Apr.	6,559	2,706	137,436	17,930
May	2,403	3,041	133,072	16,886
June	2,859	13,365	129,409	27,102
July	2,642	18,007	126,194	42,888
Aug.	2,575	13,405	122,870	52,803
Sept.	3,949	3,228	122,421	52,913
Oct.	6,532	12,843	122,250	61,954
Nov.	....	51,066	.....	109,370
Dec.	....	42,278	.....	147,320
Total	....	169,872		

American Railway Car Institute.

work, a device being resorted to by many companies since early fall. Government figures for November will show the longest average work week in months.

Purchasers See Good Year

Purchasing agents continue to view the rest of 1956 and first part of 1957 with optimism. But the National Association of Purchasing Agents says that "some of the enthusiasm which has been present is lacking." It is too early to assess the impact of the national elections or the Middle East crisis on the agents' optimism, NAPA says. For the short term, production continues high: 39 per cent say it is up, for the best showing this year. Prices are also up, although there are indications the trend may be leveling off.

STEEL's Index Firm

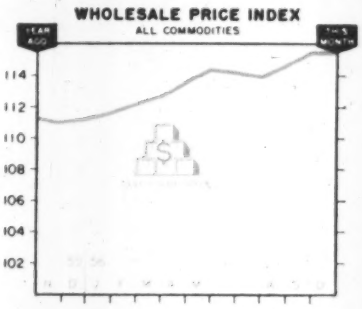
STEEL's industrial production index reflects the basic soundness of the nation's production efforts. During Thanksgiving week, when it is normal for the index to decrease 5 to 10 percentage points, the preliminary figure was 160 (1947-1949=100), just 2 percentage points below the year's high in the previous week. Both auto production and freight car loadings contributed to the decline. A seasonal rise in the output of electrical energy offset some of the effects of the holiday. Steel production held at about capacity.

Word from Detroit indicates that overtime will be the rule until production lines can catch up with demand for new model cars. Several producers report ten-day sales periods which equal or exceed similar periods two years ago when most records were set.

Appliance Sales Up

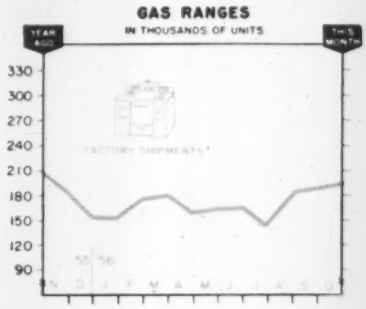
The uptrend in appliances started in late summer is still intact. The American Home Laundry Manufacturers' Association reports that October was the best single month in the history of the industry, with factory sales of washers, dryers and ironers amounting to 662,114 units. Total sales in the first ten months of 1956 are 10 per cent greater than those in the corresponding period of 1955, the previous record year.

Shipments of radios to dealers are also running well ahead of year-ago figures. The Radio-Elec-



	1956	1955	1954
Jan.	111.9	110.1	110.9
Feb.	112.4	110.4	110.5
Mar.	112.8	110.0	110.5
Apr.	113.6	110.5	111.0
May	114.4	109.9	110.9
June	114.2	110.3	110.0
July	114.0	110.5	110.4
Aug.	114.7	110.9	110.5
Sept.	115.5	111.7	110.0
Oct.	115.5	111.6	109.7
Nov.	....	111.2	110.0
Dec.	....	111.4	109.5

U.S. Bureau of Labor Statistics
*Preliminary.



	Shipments—Units 1956	1955	1954
Jan.	153,500	153,400	137,000
Feb.	178,400	186,500	152,900
Mar.	181,900	218,100	188,200
Apr.	161,400	183,200	172,400
May	166,800	187,700	163,800
June	169,500	204,000	174,300
July	146,800	146,300	134,500
Aug.	187,800	220,000	179,400
Sept.	191,000	219,100	203,900
Oct.	195,900*	210,300	197,100
Nov.	.....	184,400	174,000
Dec.	.....	153,600	147,300
Totals	.....	2,266,600	2,024,800

*Preliminary.
Gas Appliance Mfrs. Assn.

tronics - Television Manufacturers Association reports cumulative radio shipments during the first nine months are 1.2 million ahead of those in last year's period.

Factory sales of standard-size household vacuum cleaners in October broke all records for that month, totaling 371,998 units, says the Vacuum Cleaner Manufacturers' Association.

October Failures Rise

Business failures in October rose 24 per cent above the September figure, according to Dun & Bradstreet Inc., but were still under the totals for March and May of this year. You have to go back to 1939 to find a worse October, but, generally, the rate of failures (number per 10,000 enterprises) is still lower than in most prewar years. While the number of failures is alarming, it must be remembered that there are far more enterprises today than there were 10 or 15 years ago, increasing the chances of failure.

Construction: Record '57

Construction is good to bad, depending on whose prediction you happen to read. Even though it has revised its estimate down a bit to $44.125 billion for 1956, the government says it is good and going to get better. The departments of Commerce and Labor predict a total of $46.5 billion for new construction next year, an increase of 5 per cent over that in 1956. The only decreases likely next year will be in new dwelling units and stores, restaurants and garages. Housing starts will remain above the 1-million mark.

Trends Fore and Aft

- Class I railroads installed 1221 new locomotive units in the first ten months of 1956, compared with 894 during the corresponding 1955 period.
- The highway construction program will require 6600 more road-building machines by 1960, estimates C. B. Smythe, president of Thew Shovel Co., Lorain, O. At an average price of $25,000 each, this means business of about $40 million a year for the industry.
- The cost of living is still going up. The government's index rose to a new high of 117.7 (1947-1949 =100) in October, up half a point from September.

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Highest Precision
DRILL & REAMER BLANKS
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AVAILABLE FROM STOCK
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up to ½" +.0000", -.0003"
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Any size from .0135" thru 1.0000"!
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GRAY IRON AND DUCTILE IRON—

Heat treated or as cast

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LYNCHBURG FOUNDRY

SHELL CASTINGS

Uniformity is all-important in this agricultural gear—that's why it is specified to be shell molded by Lynchburg Foundry.

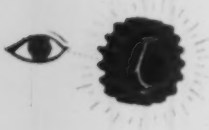
First, consider the advantages of shell molding for gear teeth, as demonstrated in this case. The allowance for backlash is held to a minimum because of the uniformity, smooth surface, and reduced draft. Further, such gears ordinarily must go through a break-in period to smooth the surfaces of the teeth. This was eliminated by casting in shell.

In the bore only a reaming operation in a floating fixture is necessary, because of the excellent concentricity possible through shell molding.

If uniformity is a must for component parts in your shop, it will pay you to specify Lynchburg Foundry shell castings.

LESS MACHINING —Close control of dimensions means less machining, faster machining methods, or in some instances elimination of machining altogether.

MADE FOR LIGHT TRAVEL —Less machine stock means reduced weight—lowering transportation costs both in shipment and within the factory.



SUPERIOR SURFACE FINISH —Shell castings have "eye appeal"—their surface dresses up any finished product. Further, a smooth finish reduces wear on machine tools.

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MERLE J. GRAHAM
. . . Allegheny Ludlum v. p.-production

THOMAS W. JOHNSON
. . . New York Air Brake v. p.

ALFRED S. GLOSSBRENNER
. . . Youngstown Sheet & Tube president

Carl B. Pollock, vice president-operations, **Allegheny Ludlum Steel Corp., Pittsburgh,** was made vice president in charge of manufacturing planning and policy. New vice presidents are: **Merle J. Graham,** production; **Dr. Rush A. Lincoln,** technical director.

A. G. Leber was made axle sales manager, **Dana Corp.,** Toledo, O. He succeeds **Ren C. McPherson,** recently named manager of the clutch division at Auburn, Ind.

Frank J. Gleason succeeds **Harry E. Thompson,** resigned, as president of **Copeland Refrigeration Corp.,** Sidney, O. Mr. Gleason, former executive vice president, continues as treasurer.

Frank S. Greenwald was made plant manager of **Stearns Magnetic Products,** Milwaukee, a division of Indiana Steel Products Co. He was director of engineering at the Valparaiso, Ind., plant of Indiana Steel.

Borden Metal Products Co. appointed **Martin Undeautsch** general manager of its Leeds, Ala., division to succeed **W. F. Ohst,** who retires Dec. 31.

Howard Conant succeeds **Cortland J. Silver** as president of **Arlington Corp.,** St. Paul.

Corey Mfg. Co., Los Angeles, elected **Ralph J. Douglas** vice president and chief engineer.

Thomas W. Johnson was elected vice president, **New York Air Brake Co.,** New York. In addition to present duties as group executive in charge of the recently formed Vacuum Equipment Division and the Kinney Mfg. Division, Mr. Johnson assumes additional operating responsibilities of company-wide scope.

Elmer W. Klapmeier was named general manager of Blaw-Knox Co.'s **Buflovak Equipment Division,** Buffalo. He succeeds **James P. Beyser,** vice president-general manager since 1954.

Charles M. Baker Jr. fills the new post of manager, Westerly, R. I., Division of **Cottrell Co.,** subsidiary, Harris-Seybold Co. He was director of manufacturing for Cottrell.

Philip C. Satterthwaite has organized and is president of **Philip Tool Co.,** Detroit. He was formerly vice president and factory manager of Cogsdill Twist Drill Co.

W. A. Patterson was named chief engineer, **Steel Processing Co.,** Pittsburgh, subsidiary of Fort Pitt Bridge Works.

Leo Haruk was made assistant purchasing agent of **International Business Machines Corp.'s** airborne computer laboratories at Vestal, N. Y. **William L. Space** was made assistant purchasing agent for special subcontracting at the laboratories.

Alfred S. Glossbrenner was elected president of **Youngstown Sheet & Tube Co.,** Youngstown, to succeed **J. L. Mauthe,** now chairman. **William H. Yeckley,** manager of steel operations, succeeds Mr. Glossbrenner as vice president-operations. **Frederick M. Mayer,** president of Continental Supply Co., a division in Dallas, was elected a vice president of Youngstown Sheet & Tube. **Walter E. Watson,** first vice president, was elected vice chairman.

Lapham-Hickey Steel Corp., Chicago, appointed **John T. Jenkins** manager of special steels.

William J. Ryan was made shop superintendent, **Cleveland Crane & Engineering Co.,** Wickliffe, O. He was assistant to the general manager.

E. C. Herrington was elected vice president, **Michigan Oven Co.,** Detroit. **A. E. Johnson** was elected vice president of the subsidiary, **Walsh Metal Products Inc. B. C. Smith** was elected secretary for both companies.

Hannifin Corp., Des Plaines, Ill., named as sales managers: **Robert G. Broberg,** air and hydraulic power cylinder division; **W. C. Thompson,** air valve division; **A. W. Blackshaw,** machinery division, air and hydraulic presses and portable hydraulic power tools.

Sam N. Roberts was elected vice

STANLEY B. WHITE
. . . Kaiser Aluminum & Chemical v. p.

FRANK J. HODER JR.
. . . heads Brown & Sharpe's pump div.

JOHN W. McEVOY
. . . v. p.-gen. mgr. of Lebus Mfg.

president - manufacturing, **Garland Mfg. Co.**, Detroit.

Stanley B. White, manager of aluminum plant operations, **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif., was elected a vice president. He also will direct the firm's expansion program.

Enoch While was named works manager at **Allis-Chalmers Mfg. Co.'s** Norwood, O., Works. He succeeds **J. F. Costigan**, recently made assistant director of manufacturing, Industries Group.

Precision Drawn Steel Co. appointed **William J. Dunn** of Boston as district sales manager for Massachusetts, Rhode Island and northern New England.

C. A. Swanson, Chicago district engineer, was named assistant to the chief engineer of **Youngstown Sheet & Tube Co.** He will be in Youngstown. **L. E. Malin**, chief draftsman at the Indiana Harbor (Ind.) Works, was appointed Chicago district engineer to succeed Mr. Swanson. **K. J. Scuderi** was made Chicago district electrical engineer; **W. B. Watkins**, chief draftsman.

George B. Croft was made western sales manager, **Automatic Molding Machine Co.**, Los Angeles.

Lewis A. Greene was made factory manager, **Aero - Coupling Corp.**, Burbank, Calif., subsidiary of Aeroquip Corp.

Brown & Sharpe Mfg. Co., Providence, R. I., appointed **Frank J. Hoder Jr.** general manager of its soon to be formed pump division. He was with Studebaker-Packard Corp.

Andrew J. McGuire was made general manager of the Los Angeles division of **Henley Steel Corp.**

John R. Dingle was made vice president-manufacturing and **Lee O. Witzenburg**, vice president-sales for both **Cleveland Worm & Gear Co.** and its affiliate, **Farval Corp.**, Cleveland. **Sidney L. Eastman**, chief engineer of Cleveland Worm & Gear, was elected its vice president-engineering.

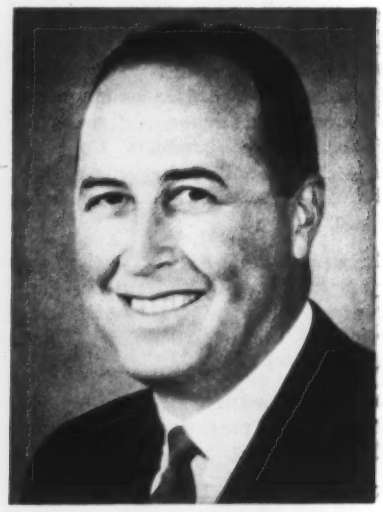
John W. McEvoy was made vice president and general manager, **Lebus Mfg. Co.**, subsidiary of American Hoist & Derrick Co. at Longview, Tex. He was superintendent of structural works in American Hoist's St. Paul plant.

McGill Mfg. Co., Valparaiso, Ind., named **William L. Ullom** assistant chief engineer; **William A. Vitiello**, design and application engineer.

Lindberg Engineering Co., Chicago, appointed **John R. Gorey** sales promotion manager.

F. R. Putnam was made assistant to the general manager of **Blaw-**

JOHN R. DINGLE



LEE O. WITZENBURG

. . . Cleveland Worm & Gear and Farval Corp. vice presidents

Jack Berger, General Foreman, Lehmann-Brandes Machine Company, St. Louis, Mo., and R. A. Loughman, Gulf Sales Engineer, watch George Mayer operate his turret lathe on Gulfcut. Gulfcut oils excel over a wide range of metal cutting applications—this firm uses Gulfcut exclusively on gear shapers, milling machines and all other machining operations, for long tool life, lower costs.

"Day in, day out, month after month, we get better results with GULFCUT"

says Jack Berger, General Foreman of Lehmann-Brandes Machine Company, St. Louis, Missouri

Lehmann-Brandes, manufacturer of engine lathes, high-speed production presses and special machinery, uses Gulfcut cutting oils because they deliver longer tool life, help reduce machining costs. And, Mr. Berger says: "Lehmann-Brandes products are precision-built. Gulfcut contributes greatly to the close-tolerance machining of components."

The complete line of Gulfcut cutting oils includes mineral-lard oils, sulfurized-mineral oils, sulfurized-mineral-lard oils, sulfo-chlorinated-lard oils and emulsifying oils. Each is scientifically compounded to meet specific needs—and the Gulfcut line includes a proper type of cutting oil *for every metal cutting need.*

Your Gulf Sales Engineer will be glad to recommend the correct Gulfcut cutting oils for you. He's at your nearest Gulf office, as close as your telephone.

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GULF REFINING COMPANY
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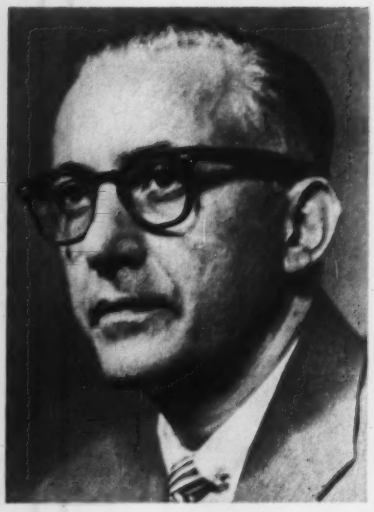
THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

JOHN E. WILSON
. . . Marchant Calculators gen. supt.-mfg.



JOHN E. FASANO
. . . Heli-Coil sales manager

HARRY E. GUDE
. . . gen. mgr. of Olin Mathieson plant

Knox Equipment Division, Blaw-Knox Co., Pittsburgh.

Marchant Calculators Inc., Oakland, Calif., appointed **John E. Wilson** to the new post of general superintendent - manufacturing. Former superintendent of parts production plant, he is succeeded by **Rollo J. Lawrenz. Gabriel Rodrigues** was made superintendent of the assembly plant.

William D. Hart succeeds **Robert Lareau**, resigned, as president of **Air-Way Industries Inc.**, Toledo, O. Mr. Hart was vice president-sales.

Joseph A. Despres was appointed administrative assistant to the vice president- engineering at **Ford Instrument Co.**, division of Sperry Rand Corp., Long Island City, N. Y.

Frederick H. Sage was named assistant general manager, **George D. Laughter Co. Inc.**, Dayton, O. He was with Hughes Aircraft Co.

Heli-Coil Corp., Danbury, Conn., appointed **John E. Fasano** sales manager; **Bayeux B. Morgan Jr.**, assistant sales manager; and **J. Laurence Sutton**, manager of customer service.

United States Steel Corp. appointed as division superintendents of steel production: **Dennis J. Carney**, Duquesne, Pa., Works; **Fred R. Smith Jr.**, Gary, Ind., Steel Works. **William D. Millar Jr.**, division superintendent-blast furnaces, South Chicago plant, transfers to the Fairless Works at Morrisville, Pa., as division superintendent-coke works and blast furnaces. **Charles J. Hunter** succeeds **A. J. Berdis**, resigned, as general superintendent, South Chicago plant and is succeeded by **John M. Walsh Jr.** as assistant general superintendent, Gary Steel Works.

Richard Powell was made general manager of the Clyde, O., division of **Whirlpool-Seeger Corp.**

Albert J. Berdis was made a corporate vice president of **Olin Mathieson Chemical Corp.**, New York, in charge of aluminum fabrication. He was general superintendent, South Chicago Works, U.S. Steel Corp. **Harry E. Gude** was named general manager of the aluminum division's Omal, O., plant, now under construction. He was division superintendent of stainless steel at U.S. Steel's Gary Sheet & Tin Mill.

Harry R. Bentley, former manager of production planning at **Chrysler Corp.'s** engine division, was made plant manager of the Trenton, Mich., plant, recently assigned to the engine division. **Frank H. Brown** was made manager of production planning and material control for Chrysler's stamping division.

Charles H. Fuchsman was made director of development of **Ferro Chemical Corp.**, Cleveland.

OBITUARIES . . .

James F. Doherty, 63, vice president - manufacturing, **American Screw Co.**, Willimantic, Conn., died Nov. 19.

Walter M. Meyer, 54, foundry superintendent at Verona, Pa., for **American Steel Foundries**, died Nov. 13.

W. B. Wingert, 55, vice president, **Semet-Solvay Division**, Allied Chemical & Dye Corp., New York, died Nov. 14.

Louis H. Derrer, 62, vice president and general manager, **Algoma Steel Corp. Ltd.'s** steel works, Sault Ste. Marie, Ont., died Nov. 25.

Pierpont J. E. Wood, 66, chairman and vice president of **Warner Electric Brake & Clutch Co.**, South Beloit, Ill., died Nov. 12. He also was chairman of Burdick Corp., Milton, Wis.

Gordon E. Tomb, 45, sales manager, San-Equip Division, **Vega Industries Inc.**, Syracuse, N. Y., died Nov. 7.

Elmer W. Hintz, 55, production manager, **Crucible Steel Casting Co.**, Milwaukee, died Nov. 16.

Automotive Steering Knuckle Support
forged from 1-15/16" Hot Rolled Round
AISI Grade 1340

FORGEABILITY

MACHINABILITY

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BALANCED TO CUT YOUR COSTS

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Balance—the correct proportion of forgeability, machinability, and heat treating properties in forging steels—directly affects your profits. Balance of these properties reduces operating costs, and also produces higher-quality, finished forgings.

Careful metallurgical control of every process from ore mine to finishing mill at J&L assures the production of forging steels with the correct balance of properties you require.

Whether you produce rugged, heavy-duty forgings or lightweight, high-strength parts, J&L forging steels give the best results. Our staff of experienced metallurgists is available to help you establish the specifications to fit your need. Write or phone our nearest district office.

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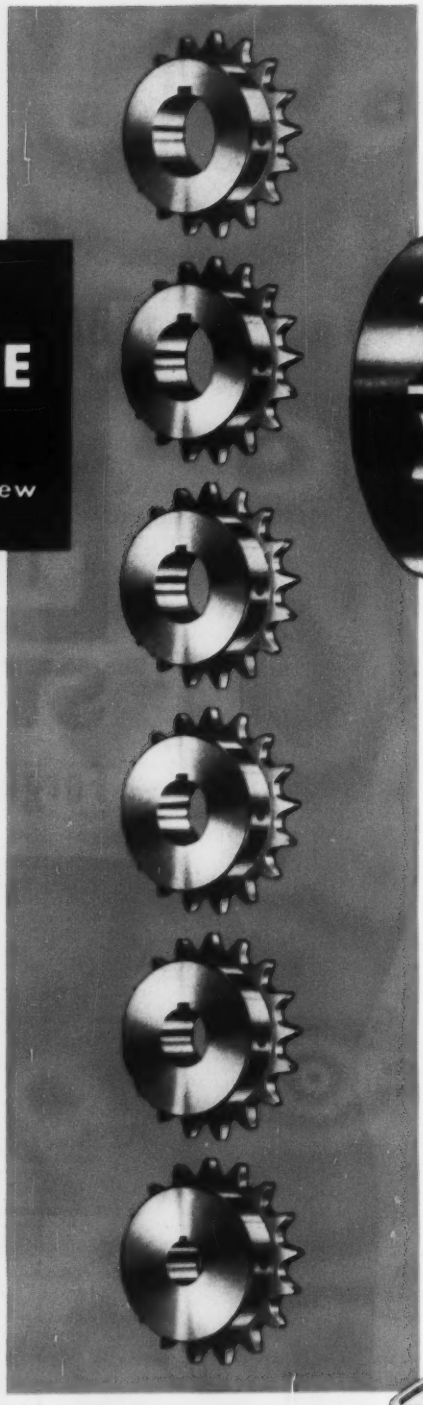
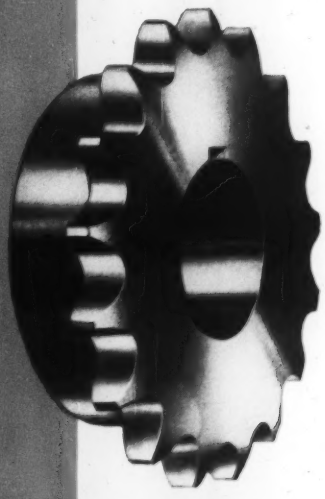
STANDARD STOCK

BORED-TO-SIZE SPROCKETS

complete with Keyway and Set screw



76 SIZES
321 STOCK BORES



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FINISH BORED — READY TO INSTALL Single width steel sprockets 3/8" Pitch through 1" Pitch—in 76 commonly used pinion sizes —with a full selection of finished bore diameters for each sprocket—complete with keyway and set screw.

ELIMINATE BORING EXPENSE You save expense of reboring, keyway cutting, drilling and tapping for set screw—and avoid downtime in emergency replacements.

BOSTON GEAR QUALITY Sets the standard for precision and performance—assures longer service life for both sprockets and chain.

OFF-THE-SHELF DELIVERY More than 100 BOSTON Gear Distributors can supply BORED-TO-SIZE Sprockets from stock. Get complete information, on any question of sprocket selection or application, from factory-trained specialists . . . at the Distributor near you. Boston Gear Works, 73 Hayward St., Quincy 71, Mass.

The BOSTON Gear complete line provides any Sprockets you need including SHOLD-A-GRIP interchangeable tapered Sprockets and Bushings. For complete listings, see BOSTON Gear Catalog No. 56.

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56BG-S-23

Operates Bar Mill

Atlantic Steel's new facility has more than three times production capacity of old mill

ATLANTIC STEEL Co., Atlanta, is operating its $8.5-million merchant bar and rod mill. Mrs. Joseph H. Girdler, wife of the firm's vice president in charge of operations, gave the signal for the rolling of the first bar.

The mill is designed to be one of the fastest of its type in the world. It finishes rods at 5000 fpm and makes merchant products at a rate of 60 to 90 tons an hour. It has over three times the production capacity of the firm's old bar and rod mill and can produce a greater range of products—including rods, rounds, flats, angles, channels and light sections of various sizes.

Builders—Rust Engineering Co. designed and erected the mill and adjacent warehouse buildings, and installed all mill equipment, auxiliary equipment and utilities. Mill equipment was built by Morgan Construction Co.

The reheating furnace can heat 90 tons of billets an hour to a rolling temperature of about 2150° F. Billets are discharged into the first mill stand by an electrically operated push-out. Three strands of wire rods, ranging from 0.218-in. to 0.25-in., are rolled simultaneously.

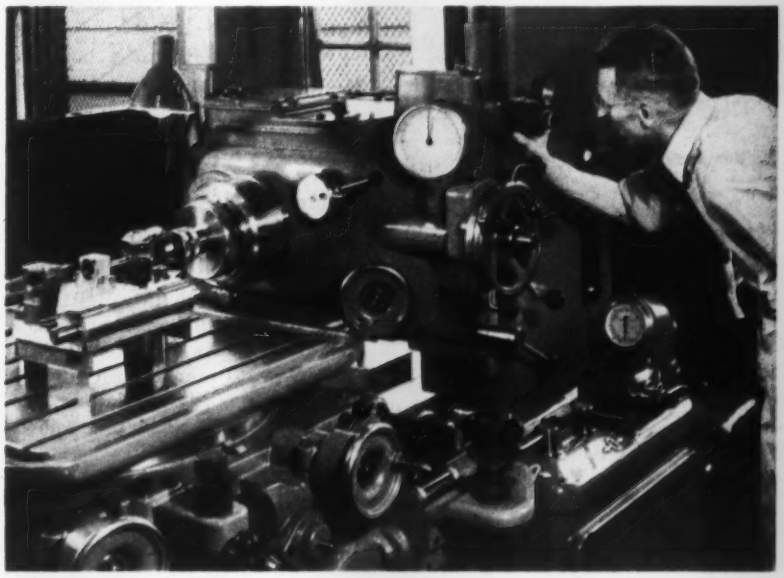
From the finishing stands, the finished rods are coiled on laying reels. Larger sizes (up to 1.25 in.) are rolled single-strand and coiled on pouring reels. They are automatically transferred to a hook conveyor for delivery to the inspection and storage area.

Plans Refractories Research

North American Refractories Co., Cleveland, will build a research center at Curwensville, Pa., in which to co-ordinate all phases of quality control and the development of new products. The center will be under the direction of F. W. Schroeder, associate director of research.

Buys Sendzimir Mill Interests

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., acquired the Sendzimir cold rolling mill interests of the Armzen Co. and will incorporate them into its operating structure as a new division. T. Sendzimir will be manager



Jig Borer Is Accurate To Tenths

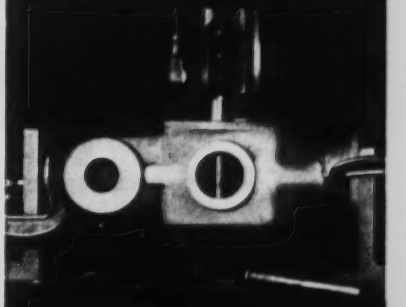
The toolroom at Warner & Swasey Co., Cleveland, uses a Swiss machine, built by Dixi, to make jigs and fixtures. A precision optical system for direct-reading adjustment of tool and work locations, plus a rotary indexing worktable, make machining so accurate that gageroom instruments are needed for checking

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

33% DECREASE IN DIE WEAR ON THIS GRAY IRON FITTING



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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

FOR FREE BOOKLET on FERROCARBO, citing actual case histories of faster machining, with longer tool life, write The Carborundum Company, Dept. 55, Niagara Falls, N.Y.

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Non-corrosive fluxes for Copper and Copper Alloys

Federated H-Fluxes are completely new! They are the most efficient, non-corrosive fluxes for soldering copper, copper alloys and any metal plated or coated with copper, tin, solder or silver. They can be stored for long periods of time without loss of efficiency.

Marked improvements in soldering efficiency and product quality are realized through use of these superior products.

Here are six reasons why:

1. **Federated H-Fluxes will never cause a joint to corrode.**
2. **H-Fluxes give improved solder spread.**
3. **H-Fluxes produce virtually no residue.**
4. **Washing after soldering operations may be eliminated.**
5. **H-Fluxes permit effective pre-fluxing and storing of parts before soldering.**
6. **H-Fluxes are safe to handle and store.**

Federated H-Fluxes can be used in all types of soldering: torch or iron, oven or dip, induction or automatic. Pints, quarts and drums are available from stock.

For prompt, detailed application information write to:

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

of the Sendzimir Mill Division. Waterbury Farrel has been the principal manufacturer of Sendzimir cold rolling mills under license from the Armzen Co.

Frasse Opens New Warehouse

Peter A. Frasse & Co. Inc., steel and aluminum distributor, held opening ceremonies Nov. 29 at its newly constructed plant on Silas Deane highway in Wethersfield, Conn. The building is three times the size of the one formerly occupied on Locust street, Hartford. Conn. The new Frasse facility will function under the direction of R. B. Goode, newly appointed district manager. Concurrently, J. W. Dehn assumed the post of sales manager for the district.

Machinery Maker Expanding

Arthur Colton Co., Detroit, will enlarge facilities for the production of rotary and single-punch tablet press punches and dies at its Mancelona, Mich., plant.

California To Get Brass Mill

Titan Metal Mfg. Co., Bellefonte, Pa., has completed plans for the construction of a $2.5-million brass mill in Newark, Calif. Its products will be brass rods and forgings.

Wrought Iron Firm To Build

California Wrought Iron Co. has been issued a permit for a $50,000 factory at 1700 W. Gedley Ave., El Monte, Calif.

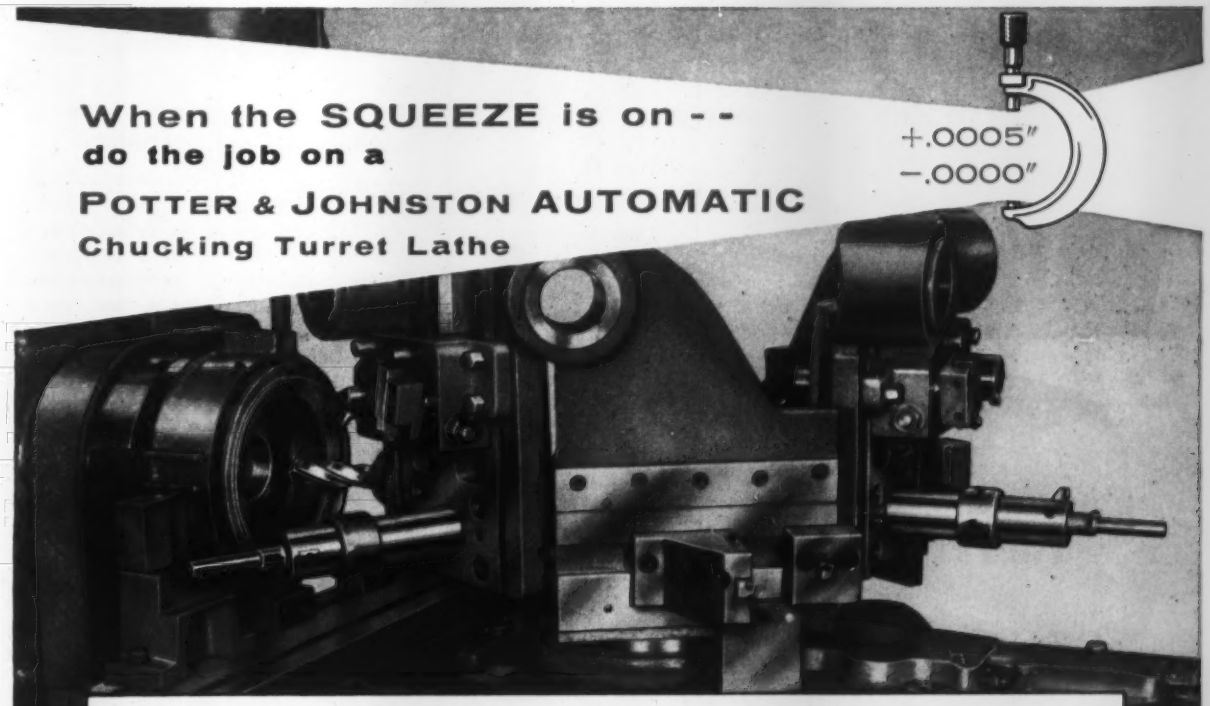
Martin International Formed

Glenn L. Martin Co., Baltimore, organized Martin International, a subsidiary which will explore and develop world markets for nuclear powered electrical generating systems. George B. Shaw is president of the new company.

Heat Treating Firm Expands

New large-capacity induction and flame hardening facilities are nearing completion at Massachusetts Steel Treating Corp., Worcester, Mass. The equipment features a 50-kw General Electric induction heater, complete with an electron-

When the SQUEEZE is on - -
do the job on a
POTTER & JOHNSTON AUTOMATIC
Chucking Turret Lathe



a job like this, for example . . .

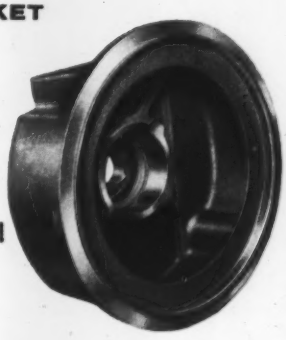
BEARING BRACKET
CAST IRON

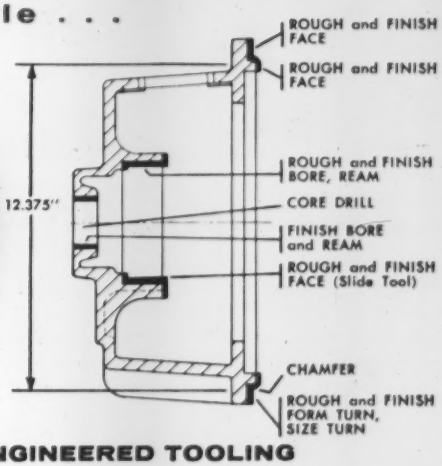
involving . . .

15 separate close-tolerance cuts including one diameter held to

HALF A THOUSANDTH !

was finish machined - -





In just 4.31 minutes on a
P&J 5-DELX AUTOMATIX with P&J-ENGINEERED TOOLING

More and more jobs are calling for really close tolerances and fine finishes *plus* far faster production rates. Yes – today's higher standards mean the squeeze is on most of the time; these days you're expected to handle, as routine, jobs that were considered "specials" only a couple of years ago. There's just one way to beat the squeeze . . . profitably! Re-equip with Potter & Johnston Automatics that have the extra speed, power rigidity and versatility it takes to produce faster, more accurately and more economically. And team the machine with P&J-Engineered Tooling that takes full advantage of combined cuts and faster-biting carbide tools to reduce machining time to a minimum.

Write for literature or phone the Pratt & Whitney Office near you, and ask a Direct-Factory Representative to call and discuss your requirements. Potter & Johnston Company, Pawtucket, Rhode Island (Subsidiary of Pratt & Whitney Company, Inc.)

POTTER & JOHNSTON

Precision Production Tooling for More Than Fifty Years

AUTOMATIC CHUCKING TURRET LATHES

...but there's still ONLY ONE MALLEABRASIVE

Imitation, they say, is the most sincere form of flattery. Well then, it's small wonder that we're flattered.

Ever since 1939 when we developed and introduced MALLEABRASIVE, it's been imitated. Yes, imitated—*but never equalled!*

Today, MALLEABRASIVE is still the leader; it's been *kept* better—kept ahead, by continuing research and by constant adoption of the most modern quality-control manufacturing facilities.

So—in plant after plant, MALLEABRASIVE continues to prove itself—continues to prove by daily production cost records that it cleans at lower cost—continues to prove that there is only one genuine Malleabrasive.

If you want to see samples of the forms used by so many plants in proving Malleabrasive's lower cost, write us.

MALLEABRASIVE®

THE GLOBE STEEL ABRASIVE COMPANY
MANSFIELD, OHIO

Sold and recommended by Pangborn Corporation, Hagerstown, Md.

IN 50 POUND DOUBLE BURLAP BAGS

ic-type heat treating machine to handle parts which will be induction heated progressively.

Schedules Plant Operations

Strategic-Udy Metallurgical & Chemical Processes Ltd., a subsidiary of Strategic Materials Corp., Buffalo, expects to have its $2-million prototype ferromanganese plant at Niagara Falls, Ont., on a continuous production basis by mid-December. Design criteria will be developed for a production plant which will be constructed next year at Woodstock, N.B. The Ontario plant will be under the management of H. V. Gluntz.

Mexico To Get Smelter

Explorers Alliance Ltd., Toronto, Ont., plans to build a $33-million plant in Mexico. A smelter with a capacity of 135 metric tons of zinc, 220 tons of sulphuric acid and 240 tons of fertilizer per day is proposed.

Bearing Firm Opens Branch

Berry Bearing Co., Chicago, opened its sixth office in the Chicago area. It is at 4438 Oakton St., Skokie, Ill. Stocks include bearings, bearing specialties and transmission appliances.

A. O. Smith Forms Subsidiary

A. O. Smith Corp., Milwaukee, organized a subsidiary, A. O. Smith Engineering Service Corp., 3844 N. Third St., that city. Officers of the new firm are: President, D. W. Sherman; vice president, H. E. Wolcott; secretary, J. R. Wallace; treasurer, M. J. Vollmer; and controller, P. D. McManus.

Kaiser Opens Container Plant

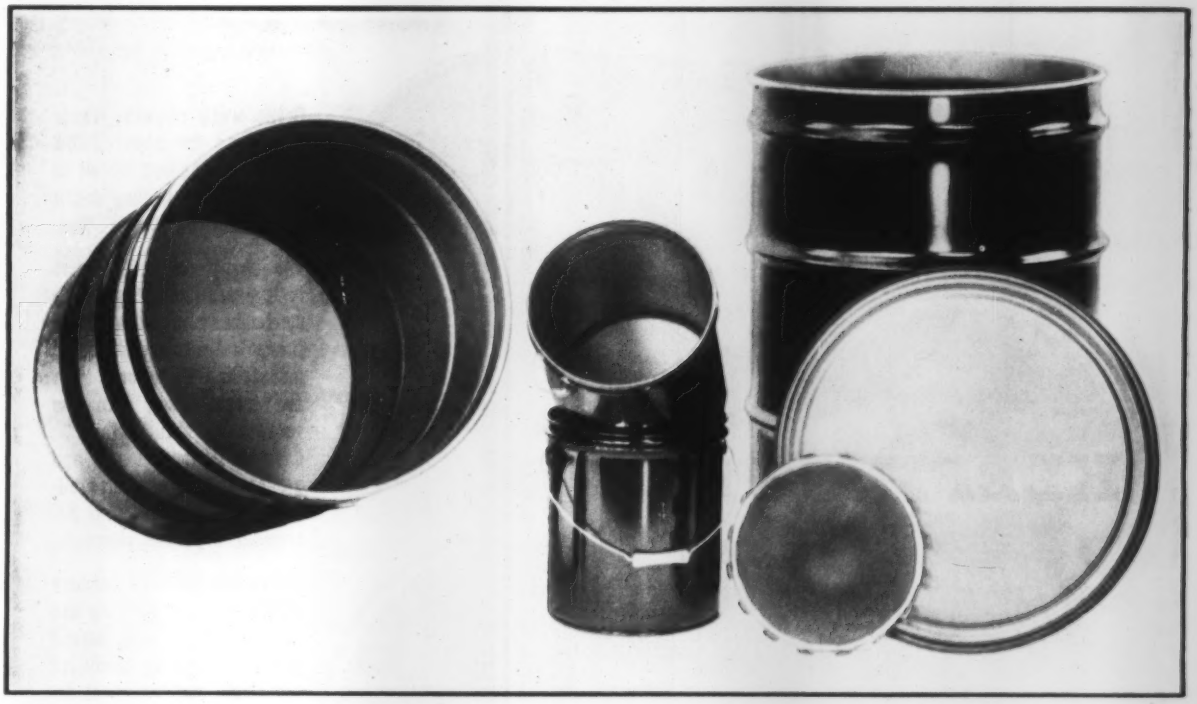
A new aluminum food container plant is in operation. The facility, constructed by Kaiser Aluminum & Chemical Corp.'s Foil Kraft Division at Wanatah, Ind., will augment production of the company's initial container plant in Los Angeles. It was acquired early this year from Foil Kraft Inc. Until the Ravenswood, W. Va., plant commences cold rolling operations this winter, the Wanatah facility

HERESITE

REG. U. S. PAT. OFFICE

P-413 CONTAINER LINING

U. S. PATENT ISSUED



HERESITE lined containers deliver products free from contamination and prevent corrosion of the container.

Approved by the U. S. Department of Agriculture as a container lining for lard and other edible fats.

P-413 offers resistance to various acids, alkalies, and many of the commodities shipped in steel containers.

Outstanding adhesion qualities on plain degreased metal—no etching—no sandblasting necessary.

Our latest booklet will be mailed on request.

HERESITE & CHEMICAL COMPANY

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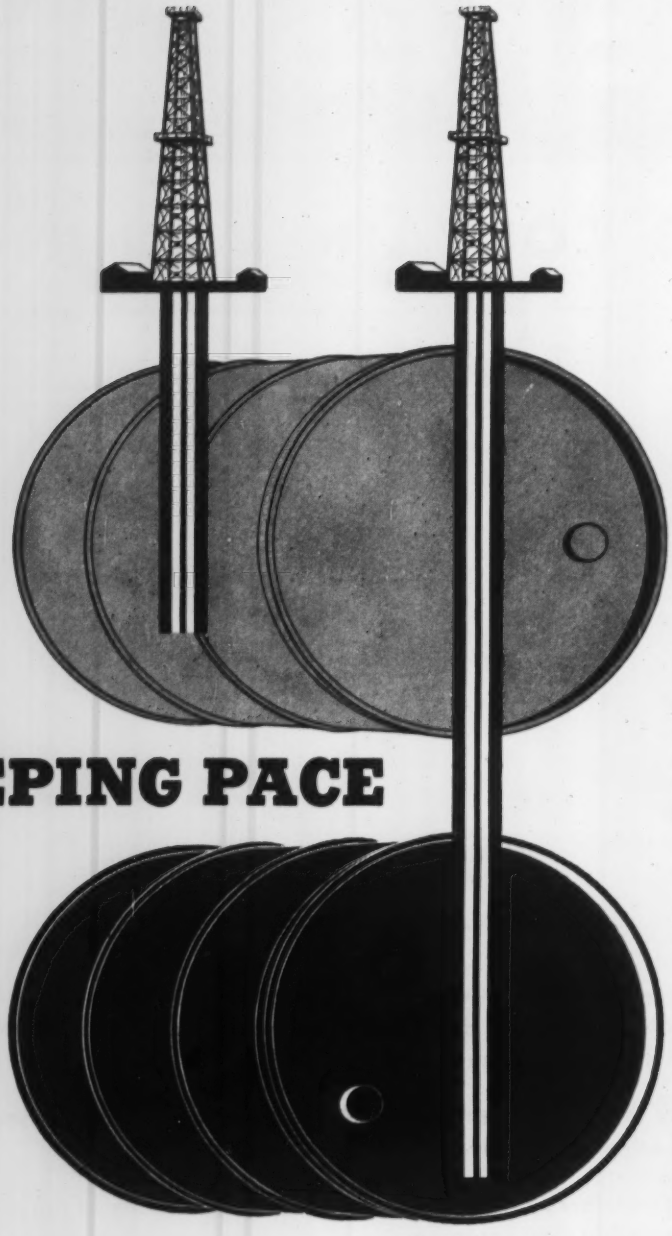


KEEPING PACE

Drills were chewing their way down for about 2000 feet in the search for oil in 1916. Today's drilling depth is more than double that.

The change in drilling that forty years has brought well symbolizes many advances in the petroleum and chemical industries. Engineers have dug more deeply into the secrets of nature, too . . . have designed plants and processes to wrest new products and services from petroleum, ores and elements.

We mentioned 1916 because that is the year Sun Ship was founded. It has long served the swift-growing needs of petroleum and chemical industries. Year by year, the engineering skill and facilities of the great Sun Ship plant have proven their ability to meet the demands for plant and equipment keyed to the swift pace of progress in these and other important fields. Sun Ship keeps pace with progress.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.

will receive light gage aluminum sheets and foil from Kaiser's mills at Permanente, Calif., and Treatwood, Wash. Robert D. McManus is manager of the Wanatah plant. It'll cost more than $1 million.

Will Enlarge Ontario Plant

Automatic Electric (Canada) Ltd. plans a $1.5-million expansion of its plant in Brockville, Ont. The project will add about 86,000 sq ft, nearly doubling its present size.

Arco Leases Albany Quarters

Arco Crown Cork & Cap Co., Brooklyn, N. Y., has leased 13,000 sq ft of manufacturing space in the Cohoes Industrial Terminal, Albany, N. Y.

Vinson Steel Builds Branch

Gulf Coast headquarters of Vinson Steel & Aluminum Co. and Vinson Supply Co. (Dallas) are nearing completion at 1211 Kress St., Houston. G. B. Lane is president of Vinson Steel; John Heinzerling is vice president.

Starts Work on Laboratory

Construction has started on a $1,151,000 nuclear support laboratory building for the Air Force's nuclear laboratory near Dawsonville, Ga. It is the largest structure for the nuclear aircraft research facility to be announced by the Air Force and Lockheed Aircraft Corp.

Croname To Boost Production

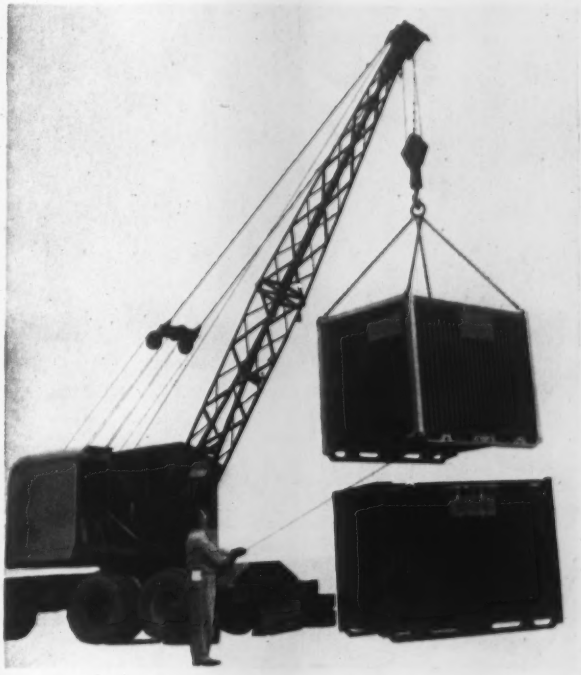
Croname Inc., Chicago, will occupy a multimillion dollar factory and office building being erected at 6201 Howard St., Niles, Ill. The firm anticipates an increase of 50 per cent in the production of its decorative metal parts and printed circuit lines.

Signode Moves Buffalo Unit

Signode Steel Strapping Co., Chicago, completed construction of a $100,000 warehouse in Cheektowaga, N. Y. The firm has moved its Buffalo operations to the new location.

jeta

LARGEST MANUFACTURERS OF CARGO CONTAINERS IN THE WORLD



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Skid openings for lift truck
Recessed lock
Shipping cube 295 ft.
Lifting lugs for crane
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Immediate Delivery

Specialists in Volume Production

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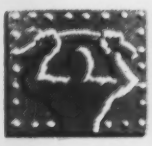

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Holland-America
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Lykes
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52 Years making quality punches and dies. Our many customers throughout the nation repeat year after year because they know they can rely on our tools for consistent performance.
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YOUR BEST Tip IN CARTS
No. 119
Sterling
HEAVY-DUTY
CART
If you're looking for a good tip for wheeling coal, scrap, chips, turnings or similar heavy materials, see these Sterling Heavy Duty Carts. Over and over again the "3-Point Landing" feature of this well-balanced cart will convince you it's the best buy for years of service. Can be furnished with pneumatics, as shown, or steel wheels . . . plain or roller bearings. Write for Catalog.
3 SIZES AVAILABLE:
No. 119 ..... 7½ cu. ft.
No. 120 ..... 9 cu. ft.
No. 121 ..... 11¼ cu. ft.
STERLING WHEELBARROW CO., Milwaukee 14, Wis.
A HALF CENTURY OF PROGRESS
Sterling
WHEELBARROWS

NEW ADDRESSES

Vickers-Sperry of Canada Ltd. is transfering its operations to a building at 92 Advance Road, Toronto, Ont. The firm makes hydraulic equipment for the machine tool, general factory and mobile equipment fields.

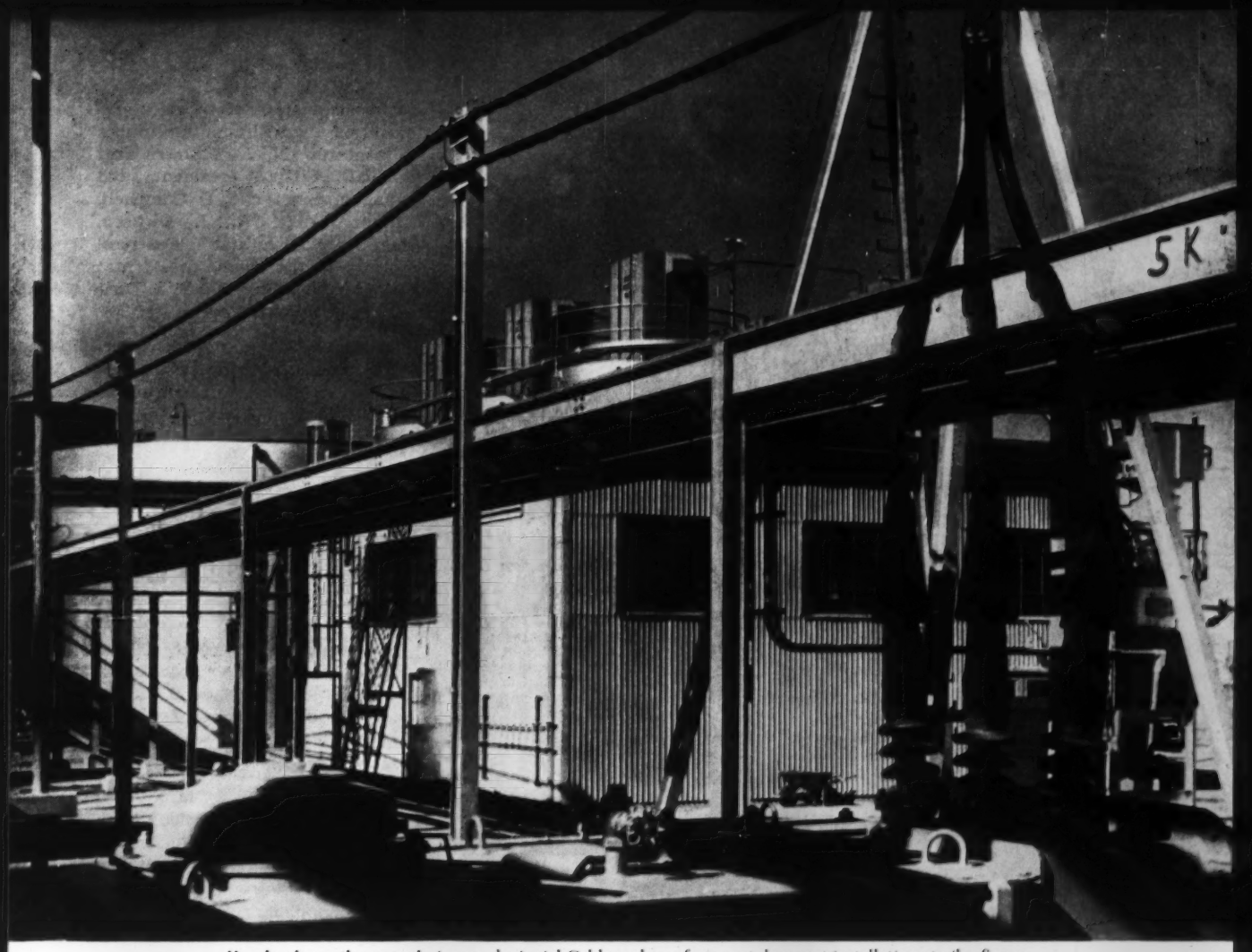
Sterling Die Division of Pratt & Whitney Co. Inc., West Hartford, Conn., has completed its move to a new plant location at 13811 Enterprise Ave., Cleveland, O. The plant houses the administrative offices as well as the production facilities of this manufacturer of thread rolling dies.

ASSOCIATIONS

American Institute of Mining, Metallurgical & Petroleum Engineers Inc., New York, elected Dr. A. B. Kinzel, Union Carbide & Carbon Corp., president for one year beginning February, 1958. Carl E. Reistle Jr., Humble Oil & Refining Co., Houston, is currently president of the institute. Grover J. Holt, ore mining department, Cleveland-Cliffs Iron Co., Ishpeming, Mich., will become president on Feb. 26, 1957.

W. A. Rentschler, Baldwin-Lima-Hamilton Corp., Philadelphia, was elected president of the **Diesel Engine Manufacturers Association**, Chicago. Other officers are: G. J. Coffey, Chicago Pneumatic Tool Co., New York, and W. E. Butts, General Metals Corp., San Francisco, vice presidents; R. H. Morse Jr., Fairbanks, Morse & Co., Chicago, treasurer; R. L. Stanley, executive secretary. Offices of the association are being moved to 2000 K St. N.W., Washington, D. C.

American Lithium Institute Inc. has been established by American Potash & Chemical Corp., Los Angeles; Foote Mineral Co., Philadelphia; and Lithium Corp. of America, Minneapolis. It was formed to meet the need for a central organization staffed to direct research on lithium and its compounds. The institute will act also as an agency for the correlation



Heads above the crowd, Anaconda Aerial Cable makes a fast, neat, low-cost installation at oil refinery.

How to handle high voltage with a low overhead

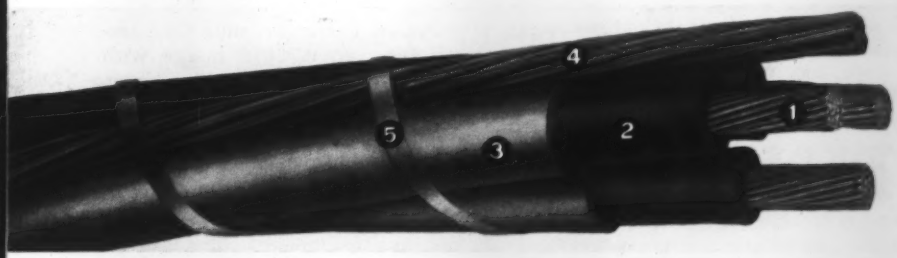
Anaconda Aerial Cable goes over crowded areas... gives highly reliable service at low cost.

Pipes and other underground structures often make installation of ducts or buried cable costly and difficult. The ideal answer: Anaconda Aerial Cable.

See how easy it is to install—no ducts, crossarms or insulators are needed. Even if underground obstructions are not a factor, this rugged neoprene-jacketed cable costs much less than buried systems.

Neoprene jacket resists weather and abrasion. Special Anaconda Type AB butyl high-voltage insulation gives extra protection against ozone, heat, moisture and fumes.

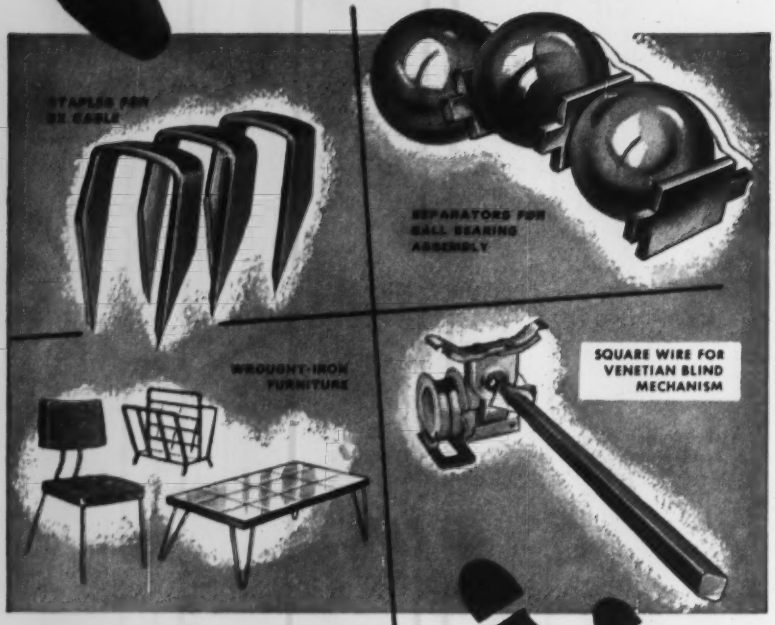
For the full story, call the Man from Anaconda or your nearest Anaconda distributor. For information on Aerial Cable write to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 50287



1. Conductors—copper or aluminum
2. Ozone-, moisture- and heat-resistant butyl insulation
3. Neoprene weather-resistant jacket
4. Messenger
5. Binder Tape

ASK THE MAN FROM **ANACONDA®**
FOR **AERIAL CABLE**

CONTINENTAL® FLAT & SHAPED WIRE SAVES STEPS


STAPLES FOR SIX CABLE
SEPARATORS FOR BALL BEARING ASSEMBLY
WROUGHT-IRON FURNITURE
SQUARE WIRE FOR VENETIAN BLIND MECHANISM

...cuts corners in production

• STANDARD AND SPECIAL SHAPES IN MANY SIZES

Shaped wire often saves steps by eliminating forging, stamping, and rolling operations—giving you a ready-made molding, product trim, or component that requires a minimum of further fabrication. Saves metal, too. From Continental you can obtain many cost-cutting wire shapes—V-shaped, oval, square, rectangular, triangular, keystone-shaped, and others.

• IN A WIDE RANGE OF TEMPERS AND FINISHES

Practically any temper, finish, or analysis in low carbon and medium low carbon steels can be specified to give you the *right* wire for the job—including #3 finish wire for electroplating.

• PRECISE MANUFACTURING CONTROL

Continental Special Shaped Wire is made under strict quality control to assure uniformity. You get a better product and fewer rejects—qualities that Continental wire customers especially appreciate. Let us help *you* save production steps, too. Write for the complete story of Continental wire today.

Wire Specialists for over Half a Century

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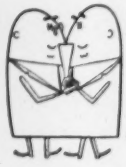
STEEL CORPORATION • KOKOMO, INDIANA

PRODUCERS OF Manufacturers' Wire in many sizes, shapes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special wire. Also, Coated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

and dissemination of technical information. It will maintain offices in Princeton, N. J. Officers are: Marshall Sittig, president and managing director; J. D. Campbell, Lithium Corp., A. J. Dirksen, American Potash, and J. Fentress, Foote Mineral, vice presidents; M. F. McCarthy of Oliver & Donnally, secretary-treasurer.

Rawson L. Wood, president, Arwood Precision Casting Corp., New York, was elected chairman of the Council of Profit Sharing Industries, that city.



CONSOLIDATIONS

Norton Co., Worcester, Mass., acquired a controlling interest in **Abrasivos Irmaos Meyer S.A.**, Sao Paulo, Brazil, maker of coated abrasives, grinding wheels and abrasive grain.

Pennsylvania Salt Mfg. Co., Philadelphia, acquired **Delco Chemicals Inc.**, Los Angeles, maker of a number of products, including specialty cleaning and paint stripping compounds. Delco's activities will become an integral part of Pennsalt's Chemical Specialties Division under A. H. Clem, general manager.

Houston Pipe & Steel Inc., Houston, joined forces with **Flori Pipe Co.**, St. Louis, as a combined operation of their parent company, Sparton Corp., Jackson, Mich. (formerly the Sparks Withington Corp.)

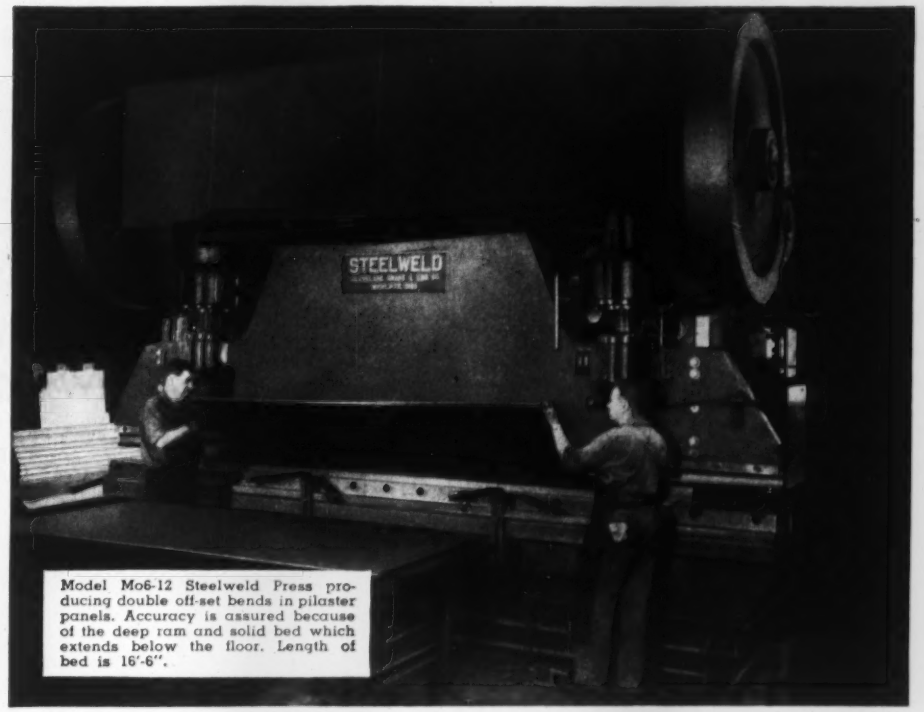
Worthington (Canada) 1955 Ltd. purchased the **Williams Tool Corp. of Canada Ltd.**, Brantford, Ont.

Joseph Dixon Crucible Co., Jersey City, N. J., will merge with **American Crayon Co.**, Sandusky, O., subject to approval by stockholders.

Link-Belt Co., Chicago, acquired **Detroit Power Screwdriver Co.**, Detroit. Link-Belt makes material handling equipment. The Detroit firm makes power-driven screw drivers and related automated assembly equipment.

Special Press features

SPEED PRODUCTION



Model Mo6-12 Steelweld Press producing double off-set bends in pilaster panels. Accuracy is assured because of the deep ram and solid bed which extends below the floor. Length of bed is 16'-6".

It takes power to make long sharp bends. It takes size and design to assure accuracy. The Mills Company, Cleveland, Ohio, well-known manufacturers of fine metal partitions achieve both with their big 500 ton capacity Steelweld Press.

But more! They also obtain speed and safety. Their machine is provided with several features that are extremely advantageous:

1. Air-electric control for high production.
2. Electric foot switches for easy fatigueless operation.
3. Ram-positioning selector for stopping ram automatically at pre-selected points.
4. Two speeds, 7 or 21 strokes per minute for best operating speed.
5. Reversing flywheel for quick stopping or reversing of ram at any point.
6. Safety dual control permitting operation only when both operators are ready.

The Mills Company are proud of their modern Steelweld Press. It is the largest of several press brakes in their plant. It is in continuous operation, two shifts a day.

GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

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BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

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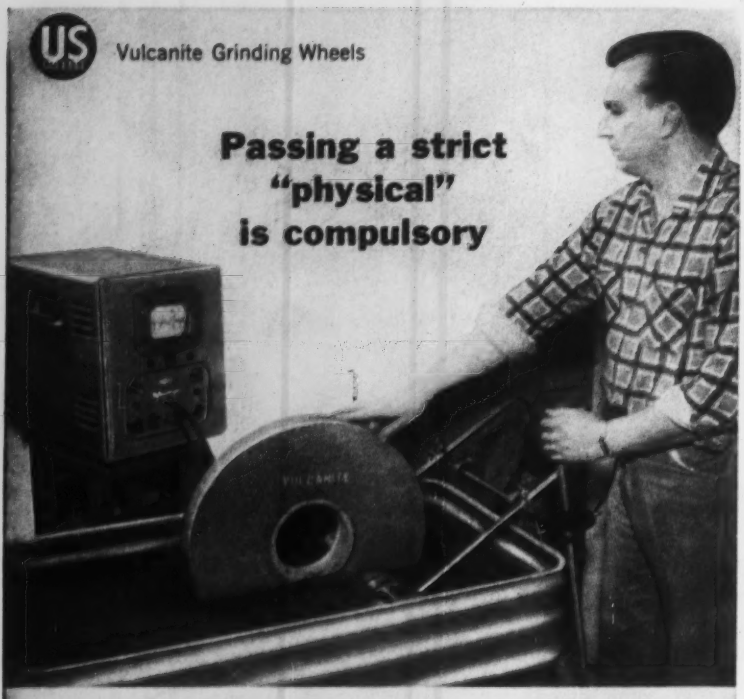

Here's a test for internal quality

The trained technician is using an ultrasonic Reflectoscope to detect any variation in density of the inside of this U. S. Vulcanite Grinding Wheel. The latest development in the field of testing instruments, the Reflectoscope permits instant and accurate detection of any imperfections in the wheel. It is only *one* of the *many* tests "U. S." makes to insure you the grinding wheel that is *precisely* right for the job...inside and out.

United States Rubber wheel technicians know the best combination of resinoid or rubber bonds and abrasives to handle your particular job in the most economical way. Their one aim is to provide wheels that remove metal with a minimum of wheel loss and a maximum of worker's efficiency. Ask them to solve your grinding wheel problem. Write to United States Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N. Y.

US Mechanical Goods Division **United States Rubber**

"The latest development in the field of testing instruments, the Reflectoscope permits instant and accurate detection of any imperfections in the wheel."

sperry products INC.

FIRST IN ULTRASONIC INSPECTION

FLAWLESS TITANIUM INGOTS

Titanium is one of today's most important new metals. Its light weight combined with great strength... ability to withstand corrosion and high temperatures... make titanium a superior material for many critically important applications, especially in aircraft. As a primary step in quality control, Mallory-Sharon Titanium Corp. of Niles, Ohio—a leading titanium producer—tests every ingot produced using a Sperry Reflectoscope. They find that important savings can be realized through ultrasonic detection of *possible* ingot flaws *before* expensive machining is begun.

As titanium is being fabricated into parts, Sperry's Reflectoscope can also be used to test for flaws at any stage of the manufacturing process.

Sperry offers a complete Commercial Testing Service for convenient, in-your-plant inspection. For complete information, plus list of sales offices, see our catalog in your company's copy of Sweet's 1956 Plant Engineering Files.

And to keep posted on latest developments in the profitable use of ultrasonic inspection, send for your free copy of our Ultrasonic Inspection News Letter.

Sperry Products, Inc.
602 Shelter Rock Road
Danbury, Connecticut

☐ Send me detailed Reflectoscope information.

☐ Send me your free Ultrasonic News Letter.

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Title _____

Company _____

Address _____

City _____ *Zone* _____ *State* _____

STEEL

December 3, 1956

Technical Outlook

ACCURATE FORGING— A precision die forging method will be used to produce propeller hubs. Test parts made by the new method meet both dimensional and metallurgical requirements. The Air Materiel Command estimates an annual savings of about $80,000 on the production of 100 hubs per month. Curtiss-Wright Corp., Propeller Division, Caldwell, N. J., was the prime contractor on the development contract. Forging and press operations were done by the Canton Drop Forge & Mfg. Co., Canton, O.

SATELLITE BOOSTS TV— Future business in satellites may result from their use as relay stations in a world-wide television system. An expert predicts that four satellite stations, traveling 4000 miles above the equatorial section of the earth, would do the job.

WATER CONTROL— A portable instrument for accurately measuring small quantities of moisture in gases has been developed by Consolidated Electrodynamics Corp., Pasadena, Calif. Called the Type 26-301 Moisture Monitor, it measures water down to 1 ppm and permits precise meter readings over the full scale range of 0 to 1000 ppm by means of a five-step attenuator. The results can be telemetered to a remote recorder for monitoring or control.

NEW FACTS— Westinghouse researchers are using a new crystallographic x-ray machine (said to be the world's most powerful) to get new information on the atomic arrangement on iron-aluminum alloys. The high intensity machine makes it possible to take x-ray photographs of these alloys at the precise moment the magnetic arrangement of their atoms is undergoing transformation in response to temperature changes. Iron-aluminum alloys have good magnetic properties and may find wide application in the electrical industry for generators, transformers, circuit breakers and similar equipment.

ALUMINUM COATING— Bethlehem Steel Co. says it's putting aluminum coatings on various products made at its Lebanon, Pa., fastener plant. Included are all types of industrial fasteners, pole line hardware and miscellaneous small iron and steel products. Corrosion tests, carried out over a period of years, show that aluminum coatings are better than galvanizing, particularly in industrial atmospheres, the company reports. Threaded work, coated with aluminum, is as clean as that with hot dipped zinc coatings.

COLOR-PROOF— A time-temperature indicating paint has been developed for heat treated parts that have been electroplated, pickled or phosphated. The red marking material changes color only after hydrogen embrittlement has been relieved. Everlube Corp., North Hollywood, Calif., makes it. It's being used by a large airframe maker on all parts where embrittlement is a hazard.

STATIC SWITCHING— General Electric Co. believes it has chalked up a first in the steel industry: Static switching on a 4-stand tandem cold mill at the Indiana Harbor, Ind., plant of Youngstown Sheet & Tube Co. The control aids in the automation of low power switching operations. GE did this job shortly after its initial installation of static switching at its Appliance Park plant, Louisville. The system controls switching operations of a new automatic conveyor that routes a variety of appliances from the main product transfer conveyor to one of several warehouse shipping areas.

Metalworking Outlook—p. 73 *Market Outlook—p. 171*

Automatic machine assembles vacuum valve parts at a GM division

Economics of Automatic Assembly

It isn't always the best solution costwise. Consider optional plans; determine how your present facilities can be used to maximum efficiency. Use trained engineers

MECHANIZATION of assembly in some segments of the auto industry can become an economic burden rather than a cost-cutting cure-all, says Glen R. Fitzgerald, director of General Motors Corp.'s Process Development Section.

Speaking to members of the American Society of Mechanical Engineers last week, he explained that each production situation should be explored to "give the best practical balance between equipment investment and cost savings. Each assembly sequence should be broken down into its separate parts, and each part should be equally self-supporting economically."

Analyze—To be sure he is getting greatest economic gain with the least added investment, a buyer should consider many optional plans. This begins with the study (including cost analysis) of the method he is using.

The next step is a thorough investigation to determine how present facilities can be used to maximum efficiency. Use trained methods engineers to develop the best manual method.

Explore—The data obtained generally indicate the basic direct-labor requirements of the total assembly sequence and each of its parts. Using these data as a base, the engineer should explore a number of manual automatic assembly combinations.

Combinations generally will range from simple improvements and partial mechanization of various operations through total mechanization.

Compare—The production engineer should estimate the manufacturing costs for the various methods developed. By comparing them with those of the present method and the best manual method, he can determine the potential savings.

In many cases, the obvious solution is indicated. In others, it may be necessary to review plans with suppliers of assembly equipment to get estimates of equipment cost to equate against the total saving.

Justify—One fact usually borne out by such studies: As the ultimate in mechanization is reached, equipment costs increase more rapidly than labor costs decrease. Total automatic operation can be justified only with the proper combination of simple operations, high production schedules and a product not subject to frequent engineering or model changes.

In contrast with manual assembly, which allows operators to sort out the occasional bar end, mixed part, or die miscut, an assembly machine can be jammed by such items. Even though the number may be small, the compound effect can cause machine down time which is prohibitive. The addition of sorting and other means of correction may add to the cost of the parts.

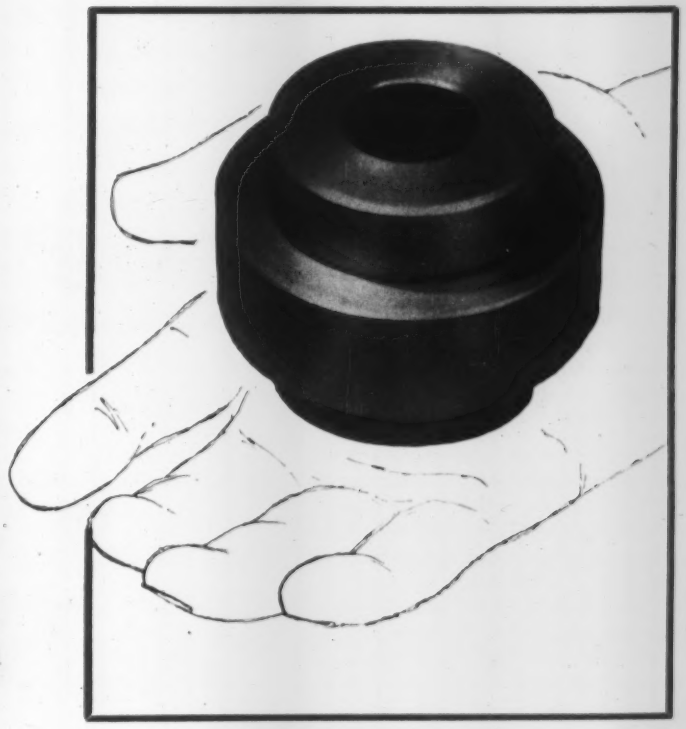
Delay—Another consideration is the time lag between conception of the assembly plan and execution on the production line. Large and complex assembly machines may require a year or more to design, make and install.

Coincident with the problem of developing or "debugging" equipment is the one of training plant personnel in its operation and maintenance.

Mr. Fitzgerald sums up: "Certainly, one of the most fertile fields today for manufacturing cost reduction is in assembly (see STEEL, Sept. 10, 1956, p. 140). But we must be sure that we do not overmechanize simply because we believe that 'because it is automatic, it must be good'."

They're becoming larger, more intricate in cross section. New presses can make production quantities of shapes that once would have required costly tooling

production ideas
NO. 6 OF A SERIES



Metal Powder Parts Get New Look

SOME of the parts coming off the line at the Gramix Department of United States Graphite Co., division of Wickes Corp., Saginaw, Mich., couldn't have been made in production quantities a year ago.

They are being compacted on the company's new 300-ton, multiple motion, hydraulic press. Built by Baldwin-Lima-Hamilton Corp., it is the first multiple-motion press of its size to be equipped with the number and type of motions normally used only in a lower tonnage press.

Shapes—The multiple motions of the press make it possible for the company to produce shapes with a counterbore in each end of a part or a hub on both sides of a flange without complicated or spring-loaded tooling. Variations of these shapes might include a double-hub part with both counterbored and through holes, or a double-counterbored part with an offset or flanged section on the outside.

To make such parts on single or double-motion presses would require dies machined to the shape of the part. In compacting, the die would transmit uneven pressures on the powder, resulting in a part with varying degrees of density. Such parts are weak, tend to crack.

Five Motions—The new press has four-columns, is hydraulically operated and its main pressing platen moves down from the top. Mounted on the platen are four auxiliary cylinders, two of which are connected to an inner top punch platen and two to an outer top punch platen. The main platen exert 300 tons of force.

The die platen, held in its top position by two air cylinders, has two adjustable stops of 300 tons capacity to limit its downward movement. The bottom, or ejector platen, has a maximum force of 300 tons. Floating and stationary core rods can be used simultaneously. The floating core rod may travel with the part during ejection, until it has cleared the die when it will expand and release its hold on the rod.

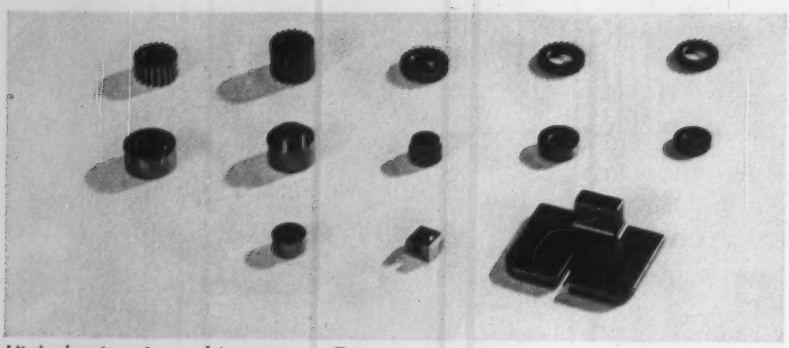
Larger—Theoretically, there is no limit to the size of compacted parts, as long as the press is big enough and can supply enough pressure.

United States Graphite's press weighs 50 tons, extends 12 ft above the floor line and 18 ft below.

Burgess-Norton Mfg. Co., Geneva, Ill., has a 500-ton Baldwin press which is making 7-lb test pieces.

Trend — The swing to larger equipment with multiple motions indicates press manufacturers have recognized the need of powdered metal part makers.

G. J. Oswald, head of the Metallurgical Research Department at National Cash Register Co., Day-



High density, sintered iron parts. Top —precision gears; center—gear blanks; bottom—coupling, flint block, stop

ton, O., points out: "We need larger presses with higher pressures, more motions and better control of motions. Control of the fill always has been a big problem in powder metallurgy."

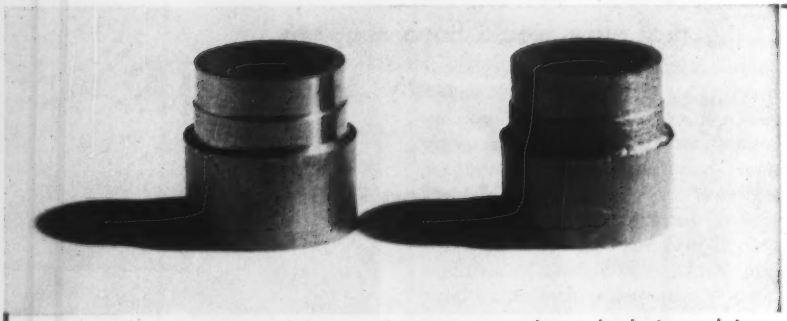
In the Works—The auto companies will be the first to go into production on large powdered iron parts, says George Karian, manager of the Tabletting Division, F. J. Stokes Corp., Philadelphia. Experimentally, they are making ring gears, automatic transmission gears, and hubs and pinions.

High Density—Applications of high density iron powder parts are growing. They find their greatest value where a high degree of dimensional accuracy must be maintained, where a lower amount of porosity is necessary, where higher impact strengths and wear resistance must be developed and where superb finishes must be provided and maintained.

Typical uses are cams, ratchets, pawls, parts to be soldered or copper brazed, parts acting with or on plastics and precision gears. Says W. J. Doelker, chief metallurgist at the Supermet Division, Globe Industries Inc., Dayton, O.: "We have found it possible to produce gears to a high degree of accuracy, uniformity and strength at a cost well below that required to produce a comparable gear by hobbing or shaving."

Gears—Some high density parts produced by Supermet are shown at the top of this page. Those in the top row are precision gears. They are heat treated and have a tensile strength of 140,000 to 160,000 psi. Hardness is Rockwell C 45 to 50. They meet tolerance specifications for Precision Class I gears, which means they have less than 0.001 in. total composite error and a maximum variation from tooth to tooth of 0.0004 in.

The middle row is a group of representative gear blanks from which gears will be hobbed. Blanks are compacted from powder by Supermet when the volume of parts is too low to warrant the purchase of a set of gear dies, or as an interim step until dies can be built. Powder blanks can be



Sample pieces of free-machining iron and standard sintered iron

SINTERED "oil-less" bearings have been made since 1921. Millions are in use; millions more will be made.

Structural parts have been getting all the attention recently because new equipment will produce larger parts with complicated cross sections.

Bearing Progress—Though developments in sintered bearings have not been so spectacular, they are equally important to users. Progress takes two paths—new materials and applications.

Just out of the experimental stage is a free-machining iron. Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., the developer of the material, says its impact will be felt in bearings, which sometimes have to be undercut or drilled, and in structural parts.

Plusses—Sintered iron parts have always been difficult to machine In turning standard density iron, you have to use a sharp pointed tool and low speeds. Otherwise, the tool will tear out iron particles rather than cut through them. Because every cut is an interrupted one, tools wear out rapidly.

Cutting speeds and surface finish of the free-machining iron are comparable to those of mild steel, says Bound Brook. In tests made at the company's plant and customer's plants, tool life was tripled. The company emphasizes that this is a straight iron material, with standard density and physicals which are comparable to those of straight sintered iron.

Visible Proof—The photo above compares a sample of standard sintered iron with one of the free-machining type. Both were machined with the same carbide tool, speed and depth of cut — rough cuts were 0.030 in. at 550 sfpm; finish cuts were 0.007 at about 1100 sfpm.

Bronze—The ASTM standard 90-10 bronze now has many variations—each for a specific use. Material selection charts of powder partmakers list at least ten "standard" variations of the material. Fabricators are ready to make variations of the variations for your application.

produced to a higher degree of accuracy and consistency than those made by machines. Gears can be hobbed with greater accuracy because dimensional tolerances (particularly on the inner diameter, which is basically the controlling dimension) can be held to 0.0002 to 0.0003 in.

Parts—The coupling (lower left) is used to connect a small high speed motor to its power transmission unit. Concentricity between the slots on each end, which are at right angles to each other, is of prime importance since these units operate as high as 25,000 rpm. Even a little eccentricity at such speeds would cause extreme vibration.

Sintered iron pole pieces are being used on direct-current motors for autos and lift trucks (up to 5 hp)

The part (lower center) is used to locate and hold the flint in a widely known cigarette lighter. Its density is high because wear resistance is needed. It is not porous and will not absorb oil, soldering flux or other liquids. The powdered metal process is the cheapest way to produce it.

The stop (lower right) is another item that shows savings in production costs. It is made to a high density and heat treated to develop the high strength and wear resistance required.

Pole Pieces—Motor makers have been using powdered metal parts for many years. Sintered, oil-impregnated bearings have become standard on nearly all appliance motors and other fractional-horsepower units. Motor makers are beginning to use solid powder compacts as pole pieces and stators on direct-current motors. Densities are close to those of standard soft iron.

Powdered metal stators and pole pieces are already in use on automobile heater, windshield wiper and window motors. Yale & Towne Mfg. Co.'s lift truck motors (up to 5 hp) have sintered pole pieces. The type motor used in toys is a big field. Coming: Automobile starter motors with powdered iron parts.

Smaller Presses — Not all the new equipment being developed is in the 300 to 500-ton class. There still is need for presses to compact

One of the newer variations of the standard material is a low density, high porosity 90-10 bronze bearing material which will hold 30 per cent more lubricant than normal sintered bronze bearings. Standard bearings contain 23 per cent oil by volume. HiLube bearings, another Bound Brook development, can hold up to 35 per cent oil.

Strength—The trick in making the new bearing is not to get it to hold more oil (the high porosity accounts for that), but to get a low density part that will not deform under load. The new material combines the required low density with sufficient physicals to carry the load.

Advantages: Since it has more oil, it will run cooler and last much longer. The material also has improved dampening characteristics which make it run quieter. Biggest field of application: Fractional horsepower motors in home appliances where long life really counts.

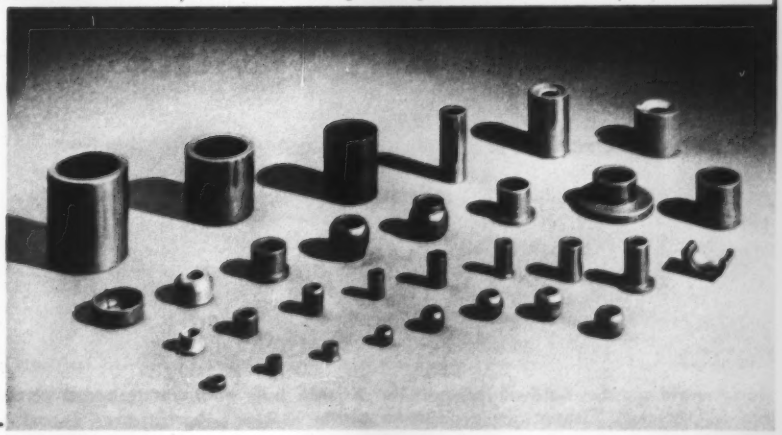
Iron-Bronze—Another significant development in materials has been the iron-bronze bearing. This material, which contains 38 Cu, 5 Sn, 1.5 graphite and 55.5 Fe, was first produced in 1942 when copper was in short supply.

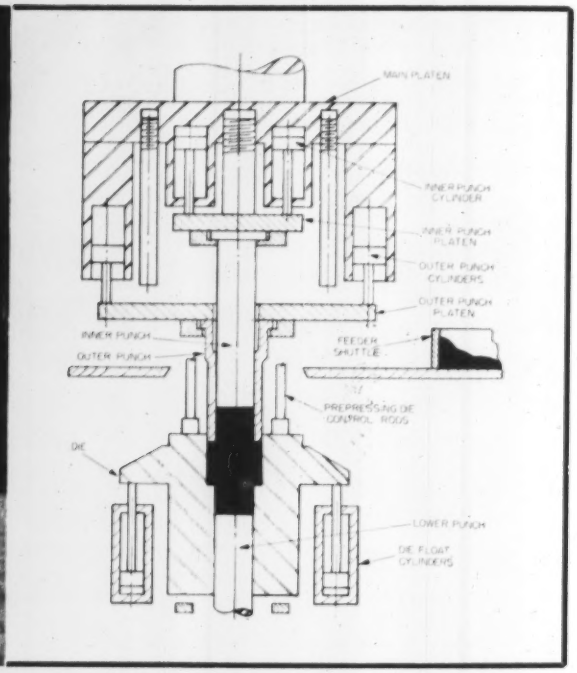
More and more motor manufacturers are going to iron-bronze because it is much cheaper than 90-10 bronze. One of the largest fractional-horsepower motor builders uses this material exclusively for bearings.

A frequently asked question: "Will the iron-bronze material corrode?" Iron normally rusts.

The answer: There is no more of a corrosion problem with iron-bronze than there is with standard bronze. The oil in sintered materials generally prevents any tendency for them to corrode.

Some of the many sintered bearings being made from metal powders





This new Baldwin, multiple-motion press is installed at United States Graphite Co. It can compact larger, more intricate parts. The drawing shows the multiple punches in position to press a part with a hub on each end

the smaller, more complex parts.

An addition to Baldwin's line is a 30-ton, mechanical, multiple motion unit. It was developed to fill the need for a low-cost, simple press which could be converted into a more complex machine.

The basic unit has one motion on top, two on the bottom. You can add one motion on top and two on the bottom, a total of six. Its speed is 10 to 40 strokes a minute.

50-Ton Unit—Stokes' Model 640 has two upper and two lower punch motions, with a stationary core rod. You can replace the core rod with a third lower motion if part design requires it.

Powdered part makers have been adding other new equipment and laboratory facilities to insure higher quality products. United States Graphite has added a new, specially designed, roller hearth sintering furnace to its Gramix Department. Made by General Electric, the furnace is fully automatic and can be set to sinter many materials.

United States Graphite recently added a $300,000 pilot plant to its laboratory. In it engineers can check production on new parts and make extensive physical and metallurgical tests.

National Cash Register Co. is working on better control of mixing and lubricating powders without adversely affecting their flowability. Production of powder parts is on the increase. Says G. W. Oswald: "We have upward of 300 parts in production or with tooling practically completed."

A. J. Langhammer, former president, Amplex Division, Chrysler Corp., and chairman of the American Ordnance Association's Powder Metallurgy Committee, states: "Practically every known industry is using metal powder products, including our armed forces. Some automobiles contain about 100 separate units."

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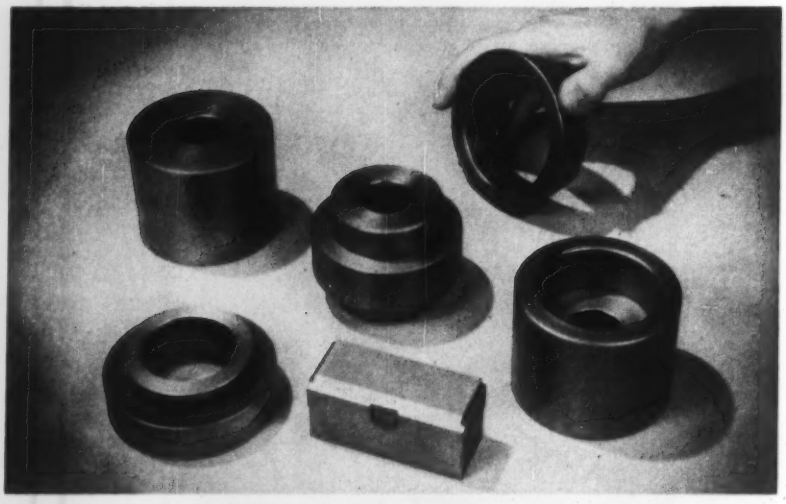
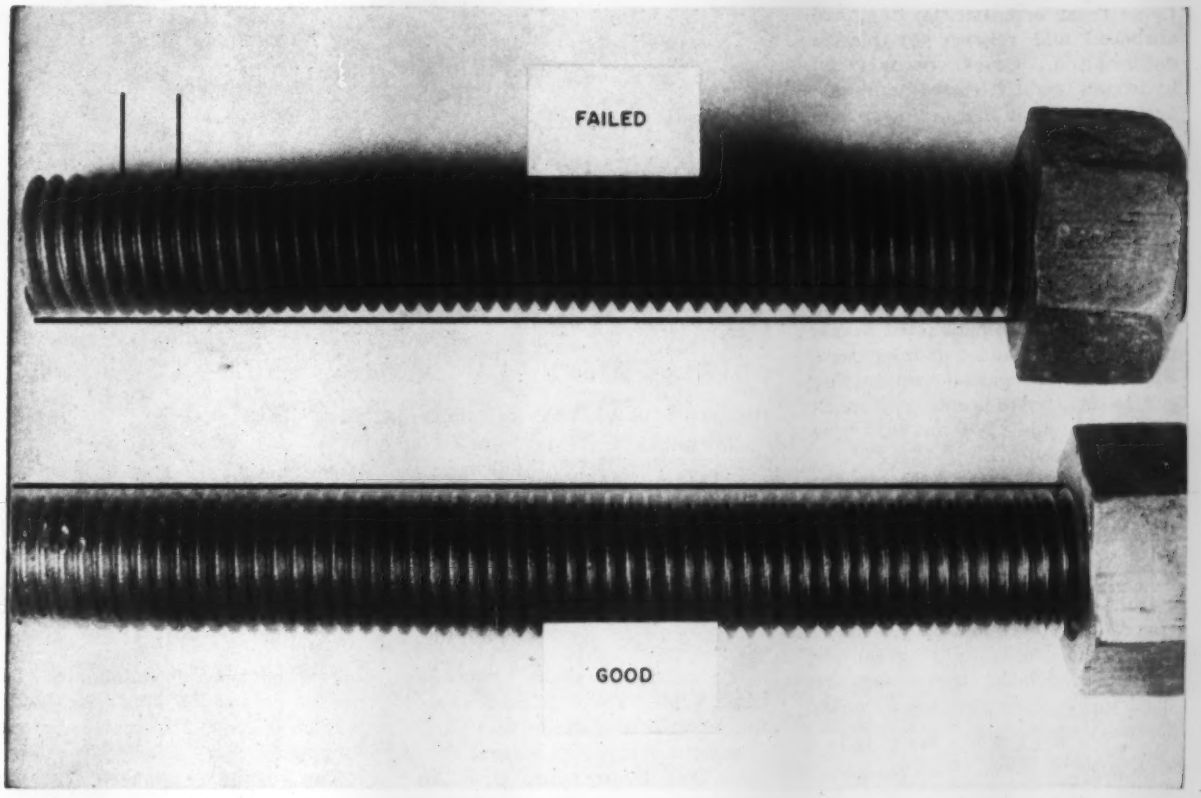


Parts made on the Baldwin press. The double hub and counterbored parts are test pieces. Others are production parts



The bolt that failed (above) and the one that didn't (below). Root cracks often are wrongly accused. Eccentric loading that produced the bend was the cause here

Why Bolts Fail

By FRED J. POSS
Senior Engineer
Westinghouse Electric Corp.
Pittsburgh

You must consider more than torque limits when you tighten a nut. Often overlooked, bending stress may be the most common enemy of durability, says the author

HIDDEN stress is one of the major causes of bolt failure.

Measurements don't always help. They sometimes indicate less than one-fourth the actual strain.

Those shown above are an example. The one at the top is broken, and bent more than the other one. Both were heat treated to an ultimate tensile strength of 160,000 psi, and initially stressed to 40,000 to 50,000 psi (extensometer). One bolt failed because the total of all stresses exceeded 160,000 psi locally.

Rules — You can minimize such problems by using these suggestions.

Inspect nut and bolt bearing surfaces. Don't allow them to deviate more than ⅓-degree from a perpendicular to the thread axis (1/5-degree for bolts larger than 1 in. in diameter).

Clean the nut and bolt bearing surfaces. Remove rust, scale, pieces of old gaskets or thread cuttings.

Lubricate to reduce friction and torsional shear. High load materials like graphite and molybdenum disulphide are the best.

Factors — Bending stresses are among the most important reasons why measured stress isn't true stress. When you tighten a nut, the bolt is being eccentrically loaded if the face isn't parallel to the bearing surface.

One of the causes is the standard for heavy nuts (ASA B 18.2-194) which allows them to be 2 degrees out of perpendicular to the axis of a bolt 1 in. in diameter (1 degree for larger ones). If such a bolt is loaded to 24,000 psi (measured by a torque wrench or extensometer), the average axial load is 40,000 psi and the bending stress is 228,000 psi. Total: 268,000 psi. Commercial bolts don't have such yield strength, so something has to give.

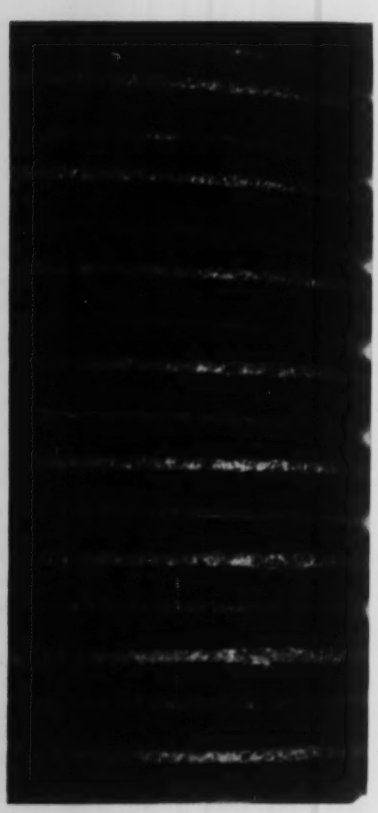
Ordinary parasitic stresses, like

those from eccentric loading, are absorbed and relieved by plastic deformation. Cracks occur when hydrogen embrittlement, sulphide action or similar factors lower ductility.

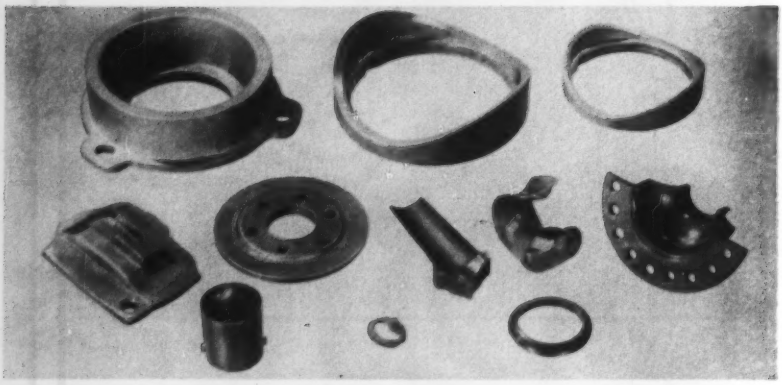
But don't always blame chemical stress corrosion. It reduces ductility and strength, but you must exceed the bolt's ultimate strength to break it.

Other Possibilities — You can get a bending moment from causes other than nut and bolt tolerances. Pieces of hard gasket and cutting refuse in thread roots can pack under one side of a nut and give the same result.

Torsion and shear stresses are sometimes overlooked in soft materials. Austenitic metals often seize and gall. Some bolts twist off long before proper axial tension is reached. It is one explanation of why torque readings don't show true stress. Up to 90 per cent of indicated torque can be used to overcome friction in softer metals.



This is what root cracks look like. Overstressing, not corrosion, is often the reason



Here are some examples of cold forged parts

Cold Forged Superalloys

SUPERALLOY parts, such as those shown above, are being cold forged to close tolerances by a process developed by Impact Products Inc., Orangeville, O. "Any shape that can be investment cast or hot forged can be made by our cold forge process," says H. B. Chatfield, vice president.

Alloys used include A-286, Inconel 700 and 713, Udimet 500 and molybdenum.

Cost reduction is not an important factor, explains Impact, although "modest economies" have been realized. The big benefits stem from properties, such as improved tolerances and finishes and excellent fiber flow. The metal gains strength, and distortion caused by heat treatment is eliminated. Stack up is prevented because parts are formed within the confines of a die.

Part Types — Parts that have been processed include diaphragm plates, instrument cams, sewing machine components, wire wheel hubs for bicycles, spherical seats and seal assemblies.

Turbine blades up to 2 in. long are cold forged. Controlled reductions and annealing give them an average grain size of ASTM No. 7. The surface is held to a high luster matte finish — depending on the polish put on the forging dies. There is no surface scale or imperfections to be polished off. Internal porosity is eliminated by use of cold-rolled slugs for blade blanks. They are tested before forging.

The company makes turbine blades which have tolerance limits of ± 0.002 in. on all airfoil surfaces. Closer tolerances can be held.

Test—The metal in cold forged parts is extremely sound, and the distribution of internal flow pattern is good, says Mr. Chatfield. A finished S-816 blade can be bent backward more than 90 degrees before hardening without developing cracks or tears. This can be done on blades with an edge thickness of 0.020 in.

"To demonstrate the soundness of our process," Mr. Chatfield states, "we have developed shrouds at the tail sections of blades by upsetting and trimming the metal to the shape and dimensions required. All edge airfoil sections are radiused to dimensions without grinding."

Turbine blades being made are ¾ to 1½-in. long, have abrupt section changes and edge sections as thin as 0.015 in. Above average results in accelerated fatigue tests are explained by small grain size, lack of cracks or internal porosity and balanced stress distribution.

Townsend Co., New Brighton, Pa. recently acquired controlling interest in Impact Products.

MICHIGAN BRASS Company saw to that by using REVERE Leaded Brass Strip

Michigan Brass has a reputation for making only quality plumbing goods. So the material for their sink strainers had to be good to start with and remain consistently so over the years. After making over two and a half million strainers from Revere Leaded Brass Strip they tell us that not only has their quality for this item been consistent, but they also have realized certain savings in production.

Here's why they use Revere Leaded Brass for their strainers:

1. The inherent corrosion resistance of brass. 2. Its deep drawing characteristics (Photo at left above shows strainer after it has been blanked and drawn in progressive die). 3. Ease of machining large diameter threads with leaded brass. 4. The excellent surface that can be developed for chrome plating (Photo above right shows strainer after it has been trimmed, dimpled, threaded and plated). 5. The consistent uniformity and quality of Revere Leaded Brass Strip over the years.

These very same characteristics of Revere Leaded Brass Strip may be the very ones that could help you retain the quality of your product over the years . . . cut your production costs. Why not have a chat with a Revere TA (Technical Advisor) and see? It costs you nothing . . . may save you plenty.

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How To Coat Steel Wire with Aluminum

1. CLEAN
Furnace bluing, alkaline degreasing, scrubbing

2. RINSE

3. PICKLE
Hot solution of hydrochloric or sulphuric acid

4. RINSE

5. SURFACE CONDITIONING AND HEATING

Gas Atmosphere Preheat		Salt Bath Preheat		Preheat and Precoat	
Sendzimir	Kaiser	Moeller	GM Aldip	Acco (Page)	Glycerol, wax or metal
Oxidation and reduction by H_2	Preheat in 10% H_2 + 90% N_2	Molten $BaCl_2$ + NaCl	Molten fluorides	K_2ZrF_6 - K_2TiF_6 (Preheat in Al coating bath)	

6. COAT
Aluminum bath at 1250-1350°F

7. QUENCH
Air blast, still air, water spray

8. COIL, OR REDRAW AND COIL

Aluminum Coating, Oil Tempering Discussed by Wiremakers

ALUMINUM coating of steel wire is getting more attention because it adds corrosion resistance, eliminates dissimilar metal contact in aluminum-to-steel applications and provides a surface which retains its good appearance throughout extended service.

Those points were brought out by J. D. Sprowl, Kaiser Aluminum & Chemical Corp., Spokane, at the annual meeting of the Wire Association, Pittsburgh.

Mr. Sprowl stressed cleanliness of the steel surface as the principal requirement in aluminum coating, warning that it is mandatory for complete coverage. The outer coating layer must be substantially free of discontinuities if good appearance is to be attained. Rust discoloration may appear as small defects when steel is exposed to the atmosphere. While this does not indicate premature failure of the wire, it detracts from its appearance.

Smooth Operation — The aluminizing line must be well constructed. Jerking and vibration of the wire will rupture the surface oxide film of the molten coating and allow the aluminum to drain erratically from the steel after it leaves the bath. The product is a coating which is not uniform in thickness. Mr. Sprowl recommended that the wire should emerge vertically from the bath to promote coating uniformity.

Bath temperature, speed of coating and cooling rate of the wire also require close control. High temperatures promote rapid growth of the interfacial layer, with a consequent loss to coating ductility. Speed of travel and length of the immersion path in the bath determine the contact time between the bath and wire.

Mr. Sprowl cited two factors that affect the ductility of the coating—slow coating speeds and long immersion paths. Extended exposure of the wire to the molten aluminum produces a thick intermetallic zone. When the coating speed is slow, the aluminum layer in the coating is thin. A heavy layer of intermetallic compound,

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PROGRESS . . .

plus the thin layer of aluminum, make for poor coating ductility. Practice shows that an aluminum layer three to five times the thickness of the intermetallic zone gives the best formability.

The cooling rate of the wire after coating should be rapid because diffusion between the steel and aluminum continues while the coating remains molten.

Coating Alloy—Mr. Sprowl cited three reasons for using alloying elements in the aluminum coating:

1. They facilitate coating by lowering the bath melting point, by increasing the fluidity of the bath and by increasing the ability of the aluminum to wet the steel.

2. They improve coating ductility by decreasing the thickness and hardness of the intermediate zone of the intermetallic compound.

3. They improve coating appearance by preventing the formation of heavy oxide films on the bath surface (which may stain the coating), by reducing the grain size of the coating and by producing a smooth, lustrous surface texture.

Here are the functions of alloying elements:

	Primary Additions
Si	Inhibits Fe-Al diffusion, decreases interfacial layer thickness, lowers alloy melting point.
Fe	Refines grain structure, increases luster.
	Secondary Additions
Na	Increases wettability of bath, modifies Al-Si alloys.
Be	Prevents oxide staining, inhibits Fe-Al diffusion.
B, Ti, Cr, Mo, Zr, V, W	Increase luster.
Mo	Increases bath wettability.
Zn, Mg	Increase whiteness.

Silicon reduces the melting point of aluminum, which lowers the minimum operating temperatures, Mr. Sprowl said. Silicon addition of up to 4 per cent causes a marked decrease in the thickness of the metallic zone, and the structure of the layer is altered from a hard, fingerlike formation to a softer band-type formation. The recommended silicon content is 2 to 3 per cent.

Iron Content—Iron accumulates in the coating alloy when steel passes through molten aluminum. About 1 to 2 per cent increases the luster of an aluminum coating alloy which contains 25 per cent silicon. When iron concentration exceeds 2.5-per cent, iron-alumi-

ÆSOP'S FABLES No. 4

Mr. Crow couldn't remember when he had ever been so thirsty . . . then, he came upon a large pitcher partially filled with water. This was fine except that poor Mr. Crow, try though he did, could not get his beak down into the pitcher far enough to reach the water. Finally, weakened and more thirsty than ever, he hit upon an idea . . . one by one he dropped pebbles inside the pitcher until the water level reached the brim . . . at last the Crow was able to quench his thirst.

Moral:
Necessity is surely the Mother of Invention.

. . . and, the *necessity* of a superior longer lasting refractory for forming monolithic hearths certainly brought about Botfield's "invention" of their popular ADAHEARTH . . . a chemically neutral chrome base refractory with a plastic consistency, ADAHEARTH has unusually strong air-set; resists spalling, molten metal, and abrasion; has low porosity, high density, absolute homogeneity of structure . . . ADAHEARTH requires fewer man-hours to install . . . insures cleaner forgings and a faster-working furnace.

Write for further literature . . . Yellow Pages of 'phone directory have your nearest "ADAMANT" Distributor.

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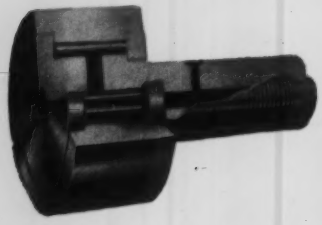
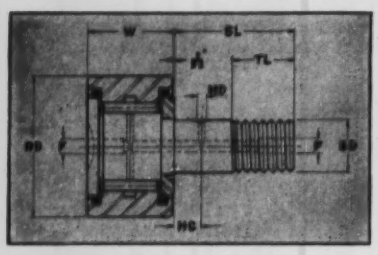
BEARING TIPS by McGill

BEARING BUILT FOR HEAVY-DUTY CAM LOADS



Camrol CF Bearings provide the ultimate in radial capacity, shock resistance and space economy for all cam actioned or guide and support roller applications. An extra heavy outer ring operates on a full complement of small diameter rollers supported by an integral inner race, roller retaining flange and stud. Designed as precision replacement for plain bearing or improvised bolt and bearing units.

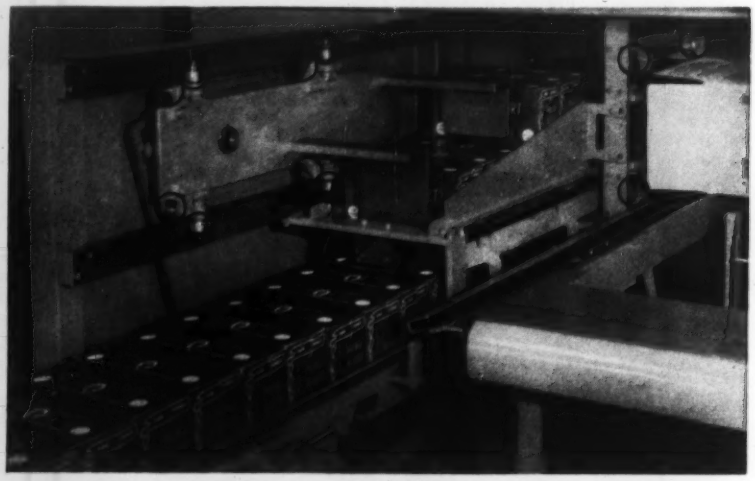
New Sealed Bearing Adds to Versatility of Standard Cam Follower



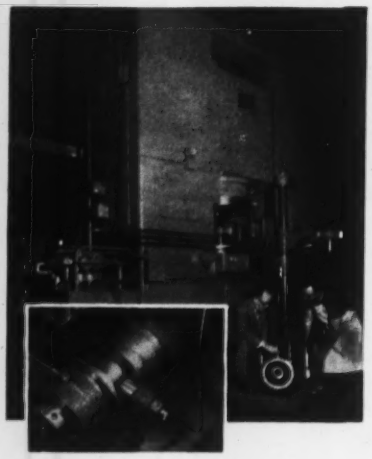
The new SCF series bearing keeps contamination out and lubrication in by means of specially-treated synthetic seals. The SCF bearing is interchangeable dimensionally with standard Camrol bearings.

140 Pages of Bearing Facts

Write for your copy of Catalog No. 52, a revised 140-page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.



CAMROL CF Bearings Cut Power Requirements on J. L. Ferguson Co. Packaging Machines



New Shear-Speed Shapers Achieve Greater Speed and Accuracy Using CAMROL CF Bearings

Michigan Tool Co. uses Camrol CF and CYR bearings in their new machines that produce gears up to 20 inches in diameter and up to 6-inch face widths in only 13 minutes. These bearings, acting as cam followers, accurately control cutting tool feed and relieve tools from the work on return strokes. They insure dependable, precision performance for automatic operation at high production speeds.

Up to 50 Camrol Bearings Used Per Machine

Used as load-carrying cam followers and as guide rollers in PACKOMATIC packaging machinery, McGill Camrol CF bearings have brought several desirable advantages to J. L. Ferguson Company in the eight years this firm has relied on Camrol Bearings.

Exceeding the performance of the roller and pin assembly formerly assembled in the Ferguson plant, the Camrol cam follower bearing has helped improve a variety of cam actuated operations on many of the versatile packaging machines built by Ferguson.

The Camrol CF bearings eliminate wear by reducing friction. This also reduces power requirements for the machines. The CF bearings cost less and are more easily applied than the previous assembly.

For trouble-free operation, up to 50 bearings per machine are now used by this company.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Full Type Roller Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

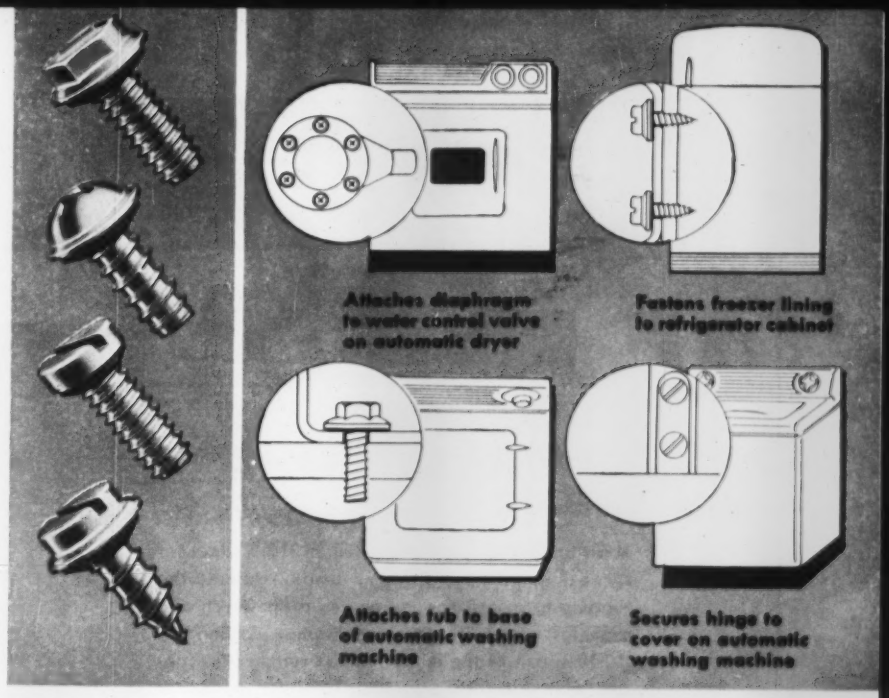
num, intermetallic compounds form in the molten bath at operating temperatures, and in the coating during cooling. Rough surface textures result. The iron content is reduced to about 1.8 to 2.3 per cent by cooling the aluminum-silicon alloy bath to 1260°F.

Lower temperatures cause coprecipitation of the other alloying additions in the form of intermetallic compounds. These losses must be replaced. Coating ductility also is reduced slightly when the iron content in the alloy exceeds 2 per cent. When the unprotected iron or steel sinker roll supports are exposed to the melt, there is a rapid iron build-up. This can be avoided by putting a suitable refractory coating on the steel, or perhaps, refractory supports.

Oil Tempering—G. A. Sweitzer, Jones & Laughlin Steel Corp., Aliquippa, Pa., described how a high quality, oil tempered wire is being produced at his plant by close control of chemistry and the use of zirconium additions for larger sizes. Wire strands from the payoff reel enter a lead contact bath held at 900°F which preheats the stock. Individual strands move from this bath through insulated troughs to an alloy contact bath held at 550°F.

Wire strands are heated by electrical resistance to the maximum temperature by an alternating current generator connected to the contact bath. This temperature is obtained just as the wire enters the second contact. Experiments with induction heating indicate that fast heating with immediate quench produces a type of martensite with greater fineness than is obtained by other heating methods.

Variations — Physical properties of electromatic oil-tempered wire vary somewhat from those produced by the conventional process. With ultimate tensile strengths being equal, the yield point of electrically tempered wire will be 2 to 5 per cent higher than that of conventionally tempered stock. In the smaller gages, this yield to tensile strength ratio may be 96 to 97 per cent, compared with 90 per cent for the conventional prod-


Attaches diaphragm to water control valve on automatic dryer
Fastens freezer lining to refrigerator cabinet
Attaches tub to base of automatic washing machine
Secures hinge to cover on automatic washing machine

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Leading appliance manufacturers are cutting production costs and improving their products by adopting Townsend Tuff-Tite fasteners. The one-piece head and washer construction of Tuff-Tites eliminates a major source of leakage. The additional pre-assembled neoprene washer not only serves to eliminate leakage, but also protects porcelain enamel surfaces from scratches and mars. Since they are resistant to vibration, Tuff-Tites have any number of applications in the appliance field.

If you have a fastening problem, Townsend specialists will be glad to make recommendations as to the proper Tuff-Tite to meet your needs. If a standard item cannot be used, Townsend engineers will design a custom-made fastener to answer your purpose.

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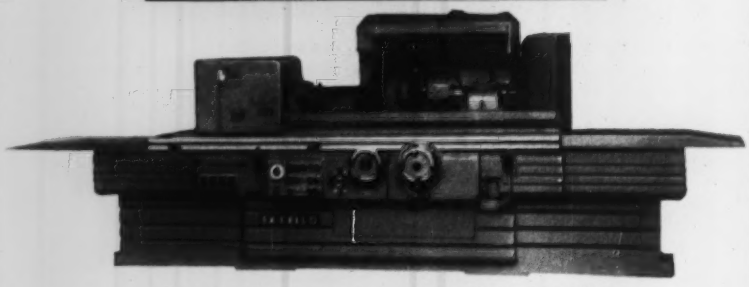

● En-ar-co Promax Cutting Oil H-310 is ideal for thread grinding. Its heavy body reduces the fogging to a minimum...provides a fine finish and prolongs wheel life. En-ar-co Promax Cutting Oil H-310 is one of the many Promax cutting oils especially compounded for higher production and lower maintenance. Specify En-ar-co Promax Cutting Oils.

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PROGRESS . . .

uct. This indicates a better service life.

Close control of chemistry is another must, said Mr. Sweitzer. In the smaller sizes, a minimum of 0.63 carbon and manganese content of 0.65 to 0.85 per cent are necessary to get complete hardening.

You can completely harden 5/16-in. wire and improve its over-all yield by adding small amounts of zirconium to the lower manganese heats. Zirconium serves as a scavenger by tying up the different nitrides, oxides and sulphides. It improves hardenability and reduces costs. Additions are made as a ferroalloy containing a high percentage of silicon. Less ferromanganese and no ferrosilicon additions are made in a heat of this type. The added cost of the zirconium addition is more than offset with the savings in other additions. All wire sizes over 0.200 in. are being produced with zirconium-bearing heats. Smaller sizes can be made without difficulty.

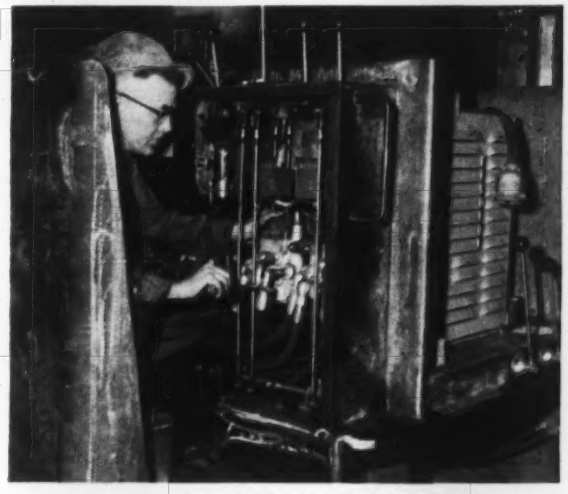
There is a trend to larger rod bundles, with manufacturers using 1000 to 2000 lb billets, and a move toward larger bundles on take-off blocks in wire drawing, association members report.

Other Features—Production of steel wire in Australia was discussed by J. K. MacDougall, Rylands Bros. Proprietary Ltd., Newcastle, Australia. That country's yearly output (about 225,000 tons) amounts to about 10 per cent of the steel produced by its two steelworks, Mr. MacDougall reported.

H. A. Myers, president, Rinkle-Krinkle Paper Co., Boston, emphasized importance of wrapping steel wire properly. He pointed out a trend toward bright wrapping paper and large labels.

New equipment came in for its share of attention. In one modern mill, six nailmaking machine operators are producing the same tonnage that used to require 18 operators, reported R. J. Fisher, National Machinery Co., Tiffin, O. He introduced the Nailmaker—a high-speed machine using carbide tooling. Cutters are redressed only every 25 million to 35 million nails. Since production is doubled, only half as many machines are required.

Proved Tougher On The Job! That's Why Elwell-Parker Trucks Use Aeroquip Hose Lines

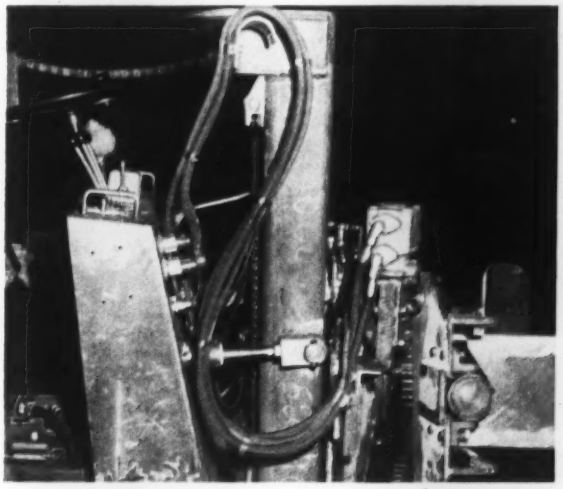


Aeroquip Hose Lines are easy to make and install, even in confined areas like this Elwell-Parker hydraulic control cabinet.

Speeds Maintenance, too, for All Types of Industrial Equipment

Aeroquip Hose Lines are used on hydraulic systems of Elwell-Parker lift trucks. Aeroquip was chosen because of proven dependability . . . and for quick replacement of damaged or worn lines, an important user advantage.

With Aeroquip Bulk Hose and Reusable Fittings, you can replace any fluid line, on all types of plant equipment, in minutes. Just cut the hose to the length needed and attach the fittings using ordinary hand tools. Call the Aeroquip Distributor listed in your Yellow Page Book or write us for full information.



Aeroquip Self-Sealing Couplings are combined with hose lines to permit quick change of lift assemblies without bleeding the hydraulic system.

Aeroquip Hose and Reusable Fittings are ideal for test stands and fluid systems that require frequent modification as production techniques change.

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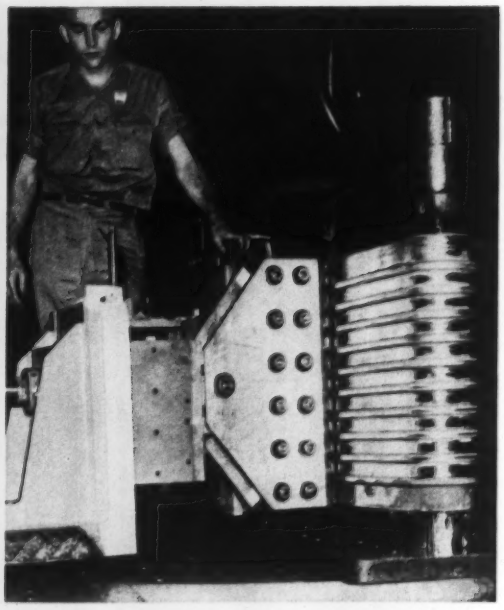
Stretch and wrap begins on the Bath contour former at Tulsa division, Douglas Aircraft Co. Inc.



Anti-icer part completed. The wiper shoe is still in place after the 180-degree bend

Wrap-Around Eases Bending Chores

Douglas Aircraft Co. uses a stretch forming machine to maintain contours of a thin corrugated structure around a tight radius. It also forms shapes with a torque twist

A 25-TON lazy susan eases bending problems at the Tulsa (Okla.) division of Douglas Aircraft Co. Inc. It fabricates such parts as canopy rails, tubing, retainer seals and angle-bar hoops for the B-47 Stratojet and RB-66 twin-jet bombers.

Officially, the machine is a radial-draw contour former, made by the Cyril Bath Co., Solon, O. One of its most important tasks is the formation of interior structures for the leading edge of RB-66 wings. Corrugated sheets of aluminum alloy are bent 180 degrees as part of the anti-icing system for the swept-wing plane.

Grab—Ends of the flat sheet are secured on opposite sides of a powered steel revolving table, in jaws which grip with 375-lb pressure. A hydraulic wiper irons the sheet against the die with approximately 300 lb pressure.

With the material held in place by the jaws, it is brought into contact with a male die centered on the table and pivot chucked at the top with an anchored steel pipe.

Turn—A plastic wiper shoe, also hydraulically operated, matches the die. In completing the 180-degree contour, the operator must exercise unusual skill in maintaining proper pressure control, especially when rounding the corner of the die.

Contouring the anti-icer unit is a two-man job. The operator remains at the console and controls the moving parts. Another man handles the preliminaries of placing the sheet in the twin jaws. Each complete operation takes 6 minutes.

After the piece is formed, pressure is increased to about 750 lb to assure nonresiliency when the unit is put into use. End stretch is held to a minimum because the revolving table rolls the die into the material.

Rails and Seals—Another recent use for the machine is in fabricating canopy rails. The bend is a shade less than 45 degrees, but the rail is given a torque twist. A kirksite die is used, secured to the table with air chucks. After being formed, rails go to other machines for drilling and finishing.

Retainer seals made of 61-SO metal, flanged and channeled, are formed in the same general manner as the anti-icer parts, using a wiper shoe which follows the contour of the die. Later, they go to the heat treat department, where the pliable metal is conditioned to ST, SW or ST6 hardness.

With light gage metals, some orange peeling has been noted, but not to any consequential degree. Heavy paste wax applied to the die and wiper shoe minimizes the chance of scratches.

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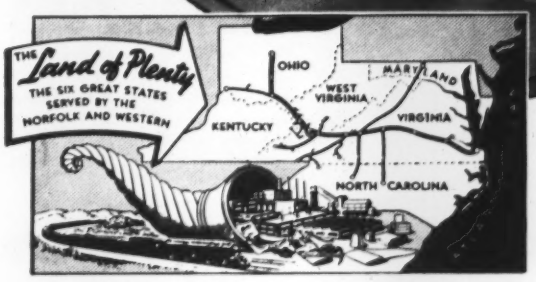
in Plant Location

Any way you measure the Land of Plenty, it will measure up to the requirements of industry . . . for here in this rich six-state territory are the essential elements needed for successful manufacturing.

There's an abundance of superior-grade Bituminous Coal and limestone, plenty of electric power, ample industrial water and a large force of home-rooted, intelligent workers. Big U. S. markets are nearby, and there's quick access to world markets through the Port of Norfolk on famed Hampton Roads.

Before selecting a new plant site, we invite your careful consideration of the Land of Plenty. Our experienced plant location men will be glad to assist in your investigation. Call on them for accurate, detailed confidential information . . . without obligation.



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comes in any size up to 23′ for any power capacity

This continuous tooth gear is welded construction with a split hub, has 144 teeth, 5 DP, 46″ face, 144.520″ outside diameter.

Farrel continuous-tooth herringbone gears are made in a complete range of sizes from ¼ inch to 23 feet diameter, ¼ to 60 inch face, 24 DP to 0.75 DP, for any power capacity and any application.

The backbone in Farrel herringbone gears, formed by the meeting of the two helices without a center groove, puts the entire face width of the gear to work for you. This pays off in extra strength and greater load and shock capacity—ideal for heavy-duty applications.

Farrel can also supply straight tooth (spur) gears, single helical gears and internal gears in a wide range of sizes—all precision-generated on Farrel-Sykes machines.

Farrel engineers are available for consultation on your gear problems.

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Precision Plus

A new comparator will check gage blocks to the nearest ten-millionths of an inch

ARE you dissatisfied with precision that goes only to a millionth of an inch? Because a number of production men are, the National Bureau of Standards has gone to work on a new comparator.

Bureau scientists have come up with a new interferometric (uses light bands) comparator that makes routine comparisons of length to the nearest *ten-millionths* of an inch. The instrument will be used to check the lengths of industry's master gage blocks which control the tolerances of mass produced machine parts.

No Guesstimates—Like other interferometers, the bureau's determines the relative positions of reflecting surfaces by interference fringes. They are formed by light reflected from these surfaces. But readings are taken directly from a micrometer screw with this instrument.

Another Simplification — White light replaces the usual monochromatic sources. So the measurement doesn't depend on the wave length of light used. This simplifies the measuring procedure. Operator training is minimized.

How It Works—Gage blocks being compared are wrung to the horizontal surface of a flat plate so they stand on end, side by side. A double prism transmits two beams of collimated light down onto the tops of the blocks and the flat surface.

After they're reflected, the two beams are combined at the prism's dividing surface, and two separate patterns of interference fringes are formed in the eyepiece of the telescope. If the two blocks are of equal length, these two patterns will coincide, but if there is a difference in length, the fringe patterns will be proportionately displaced with respect to each other. The operator adjusts a micrometer to bring the fringes together, and the micrometer reading can be translated into a difference in block length.

GE Buys Big Broach

Pine-tree holding slots in huge stainless steel turbine rings will be machined on an electromechanical drive unit with a 240-in. stroke and a 50-ft bed

IN ABOUT two months, General Electric Co., Schenectady, N. Y., will take delivery on a giant horizontal broaching machine. Production men will put it to work on gas turbine wheels that are 40 to 80 in. in diameter.

The machine will broach 30 to 150 pine-tree slots in the wheel peripheries—they hold the blades in place. The wheels will be used in GE's 16,500-kw gas turbine.

Metal Removal — Built by Lapointe Machine Tool Co., Hudson, Mass., the machine has a 240-in. stroke and a 50-ft bed. An adjustable-voltage, 100-hp broach drive moves the 16,000-lb slide.

Broached slots are 1.6 in. deep and up to 5 in. long across the wheel rim. About 150 lb of metal comes off each wheel. Broaching time is 2 1/3-hours on a 90-slot wheel.

Double Pass—Slots are broached in two passes. All slots are roughed; then the wheel is again indexed through the cycle while the slots are finished.

The index on the wheel is held to within 0.002 in., and the broached form is held to within a tolerance of 0.0003 in. Lapointe high-speed steel broaches are used to cut the 422 stainless wheels.

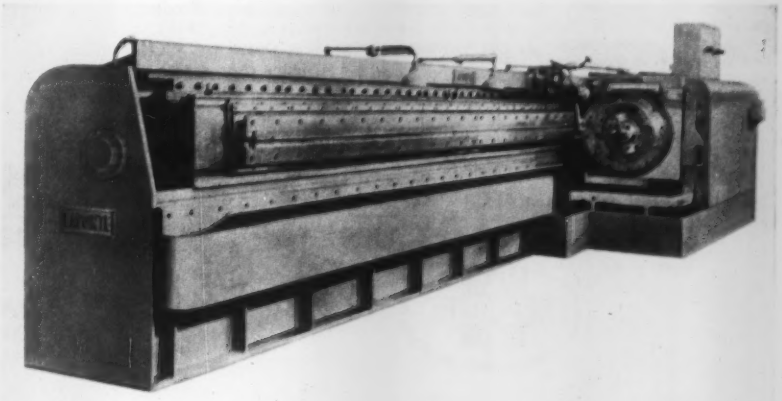
Made of steel weldments, the machine weighs about 150,000 lb.

Pre-Engineering

Builders of special machine tools, particularly automatic and transfer machines, are building fires under their customers. The goal: Get rid of the request that simply says: "Build me a machine to do this automatically."

Leonard Swanson, president, Swanson-Erie Corp., Erie, Pa., emphasizes the importance of pre-engineering programs. He recommends that the customer contract with (and pay) a builder to make a detailed study of the job, find out what's needed to meet required tolerances, production rates and budgets. This information becomes the property of the user.

The biggest advantage is that all subsequent bidders would know what the job entailed. All bids would be truly competitive: They would be tailored exactly to user requirements.



Giant broach has 50-ft bed, 240-in. stroke

New Republic

REPUBLIC NYLOK NUTS offer advantages similar to those of Nylok bolts. They can be assembled from either end with hand or power tools, and lock tight wherever wrenching stops. Holding power is not affected by vibration. "Plastic memory" of nylon pellet gives Nylok nuts excellent adjustment and re-usability characteristics.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Self-Locking Nylok Bolts

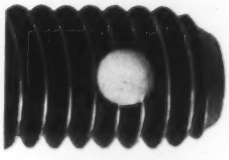
Provide Single-Unit Answer to Vibration, Liquid-Sealing and Adjustment Problems

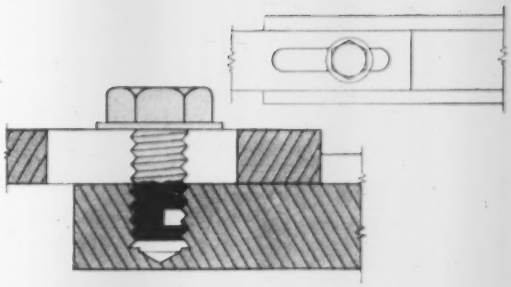
If your bolted assembly must be vibration-proof, liquid-tight or adjustable—Republic Self-Locking Nylok® Bolts are your best fastener selection. You simply align parts to be fastened and turn Nylok bolt into threaded hole. A positive lock is provided, whether or not the unit is seated.

In addition, use of Nylok bolts eliminates lost motion of assembling extra locking devices or expensive wiring. They can be hand wrenched or power driven to minimize fastening time—a tremendous asset in high-volume production runs.

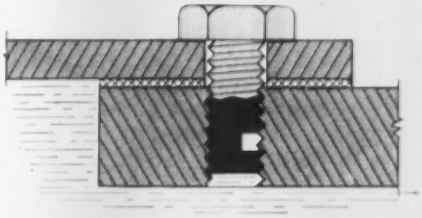
Locking is accomplished by means of a permanent nylon insert in the body of the bolt. This pellet wedges opposite mating threads together to form a vibration-proof lock. There is no damage to threads or seating surfaces, and the insert's resiliency allows fasteners to be adjusted and re-used repeatedly. Further, when properly seated, the nylon insert effectively blocks fluid flow around the helix of the threads. Even relatively soft materials can be locked to a threaded member using Nylok bolts.

When you specify Republic Nylok Bolts you secure the double protection of Nylok locking plus Republic quality, built into each fastener from raw ore to finished product. To find out how you can take full advantage of this ideal combination, contact your Republic representative. Or mail the coupon for further information.

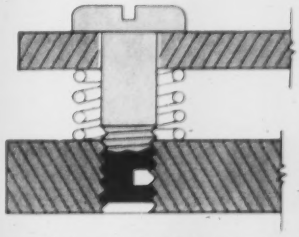




ADJUSTMENT problems like this movable plate are readily solved using Nylok bolts. The nylon pellet allows bolt to be backed off and wrenched tight time after time, without damage to threads, seating surfaces or holding power. Unaffected by age, immune to fungus, pellet won't dry out or shrink.



LIQUID SEALING properties of the Nylok bolt are demonstrated here. Nylon pellet, seeking to regain its original shape, effectively interrupts space between non-loadbearing surfaces of mating threads. Escape of fluid along helical thread path is blocked. Nylon's resistance to moisture and ordinary solvents assures permanence of seal.



VIBRATION has no effect on the locking characteristics of Nylok bolts, even when not wrenched tight as shown here. Secure grip is provided by nylon pellet permanently imbedded in fastener body. Continual pressure of resilient nylon forces tight metal-to-metal lock between mating threads opposite the pellet.

STEEL

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Please send me further information on Republic Nylok Bolts and Nuts.

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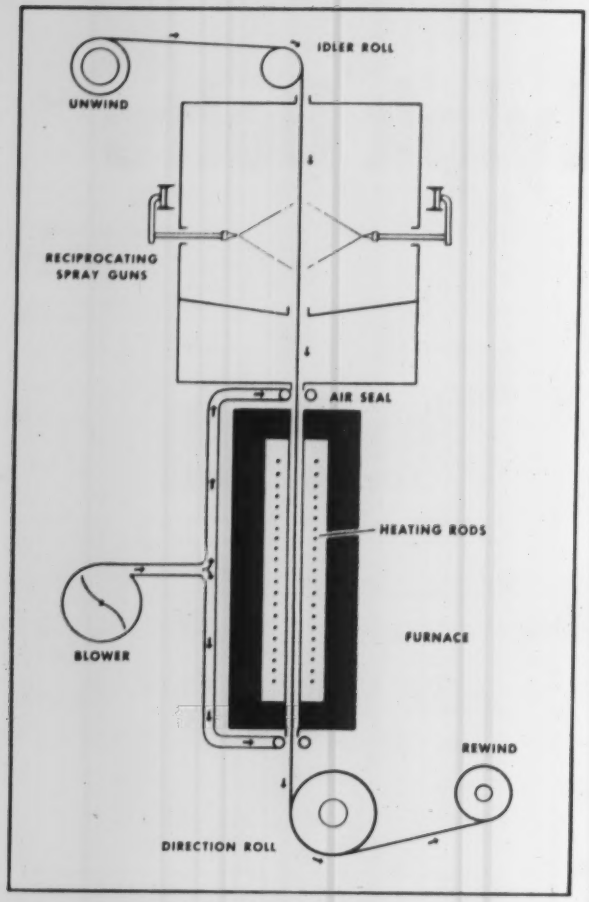


A MACHINE which puts porcelain enamel on aluminum foil is going into full production at Allianceware Inc., Alliance, O. It was built (then operated for two years as a pilot plant) by Ferro Corp., Cleveland, so there is no question about its workability. The question is: Why put porcelain enamel on foil?

Certainly, there is nothing else like it. The foil can be 24 in. wide. (A bigger machine could make it wider.) The enamel coating can be brilliantly colored and textured from full matte to gloss. It has the qualities of a true glass: Abrasion resistance, chemical resistance and cleanability.

You can bend it, dent it or twist it, and the enamel stays on. The 0.003 in. coating on a 0.005 in. base of 1100 or 3003 alloy makes a material that can be cut with household scissors, drilled and punched without damage.

Process—In the diagram of the machine (left), spray guns are shown applying enamel slip to both sides of the strip. One-side application is equally practicable. The strip moves through at 4 fpm, but a bigger machine could go faster. With the addition of a cutoff shear, sheets could be turned out as easily as coiled stock. The aluminum needs no cleaning before coating.

The question remains: What's it good for? Three fields look ripe for exploitation: Architecture, transportation and electronics. The foil can be applied with adhesives to a wide variety of backings for interior panels, doors, work surfaces and trim. In the transportation field, it might be used for interior panels, heat barriers, trim and corrosion resisting splash pans. Electrical insulating properties of the glass coat, combined with the conducting qualities of aluminum, should give the electronics people some ideas.

What would you use it for? Allianceware is open for suggestions.

New Directions for Porcelain Enamel

REMEMBER when "porcelain enamel" meant a bathtub on legs and a chipped blue sauce pan? Enameling has gone places since then. Add a gasoline pump, a Coca-Cola sign and a skyscraper wall to the picture. Take away the chips.

A pretty good indication of how far this process has come could be had at the University of Illinois on Nov. 7. On that day more than 250 industry members attended the 18th Shop Practice Forum of the Porcelain Enamel Institute. These are some of the things they talked about:

1. Enameling on aluminum.
2. Enameling on aluminized steel.
3. Low firing temperature frits.
4. Convection heated furnaces.
5. Electrostatic spraying.
6. The color market.

Frit—Nothing has shaken the industry so emphatically—and pleasantly—as low melting point frits. These glasses, which mature at temperatures below 1300° F, became available about six years ago.

Their advent brought aluminum into the porcelain enameling industry. It obviously belonged there, alongside enameling iron and copper, but when fired above 1050°F, it lost its shape and strength and became generally unsuitable as a base material. With 1000°F frits, it became possible to take advantage of aluminum's lightness and corrosion resistance.

Building—Architects were quick to adopt aluminum enameled panels. They came at just the right time to ride the curtain wall construction boom. The low firing coatings proved to be tenacious, so that panels could take a considerable amount of punishment without having the surface chip or crack.

This tenacity produced an additional benefit: Enameled structures could be sawed, drilled, cut with tin snips, riveted and, in some cases, even welded without ruining the glassy surface. Some of the products that have gained from the aluminum-enamel partnership are bathrom wall tiles, refrigerator panels, metal siding for houses, venetian blinds, highway signs, interior building partitions and exterior panels.

Utensils—Pots and pans used to

be a stronghold of porcelain enamel, but until recently the material steadily lost ground to aluminum and stainless steel. At least two makers of cast aluminum utensils were quick to take advantage of aluminum enamels.

Most of the low melting point frits have a lead base. Although lead poisoning from a fused lead-bearing glass appears unlikely, the utensil makers have played it safe by applying the finish only on outside surfaces not in contact with food. They seem to have licked the problem of chipping, once the bugaboo of the pot and pan industry. And now they have more good news in the form of low melting enamels, just introduced, that contain no lead.

Reaction to the new enamels has been good. They are neither so hard nor so glossy as the high-firing types, but they are hard and glossy enough for long use, and their chip resistance is excellent. Housewives like their colors. Even enameled iron utensils have ridden back on the color bandwagon.

Feedback—Enameling iron (low carbon steel, free of flakes and laminations) has been hard to get, so that many makers of conventional enameled products have had to substitute cold-rolled sheets. Now it turns out that the enamels developed for aluminum have applications for these metals as well. The enamels show the same good qualities of adherence with steel that they do with aluminum, and what is more important, their low firing temperature means less warpage of the base material.

Warpage has always been a big problem in enameling. The base material has had to be beefed up by extra thickness or brazing, or the enamel has had to be applied to both sides to equalize tension. The new enamels and new base materials appear to have that problem licked.

New Bases—It should come as no surprise, for instance, that aluminized steel is enjoying a big play as a base metal. Its steel core between aluminum faces gives it great rigidity; it resists warping with enameling on one side; it resists corrosion and can be field cut after enameling.

Enamel on stainless is another. With low temperature frits, it can be produced with excellent results. The accent is on decoration, not protection. In many proposed uses, the metal is embossed with the enamel applied in the sunken sections. Such an application calls for the lavish use of color.

Color—To an industry that specialized in white for 30 years, color means new life. It's far from new in the industry (colored enameling predates the Christian era), but color matching is.

It used to be standard procedure to add coloring oxides to the white frit. The color of the resulting glass varied with the surface of the base material, the method of slip application, the firing time and temperature, the reflectance of the fused surface and the day of the week. Now many colors come prefused into the frit, and scientific color matching methods have taken out much of the guesswork.

The implication is that manufacturers can now turn out colored appliances that will match at the beginning and end of a production run. Architectural panels won't have to rely on a breaker strip between to keep the eye from perceiving color differences. You can buy a spare part and know it will match the color of the original.

Problems, Too — The trouble with color, as the auto makers found out, is that once you start, there's no limit. Members of the Porcelain Enamel Institute are talking about industry-wide color standardization, but there's not much hope of agreement.

Each appliance maker is bravely striking out in his own direction. In the past year, preference has been shown for petal pink, turquoise and canary yellow. Don't expect a change of emphasis to ranch house brown, coral or gray to come overnight. "Good" colors can have a three to five year run.

Technique — Wherever organic baked enamels tend to fall down, porcelain enamelers sense a demand for a return to their product (and will show you surveys to prove it). Examples: 1. Washers, where water and detergents combine to peel paint. 2. Dryers, where heat does the same. 3. Work surfaces, where scratching and staining are problems. More appliance makers will be glad to return to porcelain enamel if real progress can be made toward eliminating two coat finishes, warpage rejects and handling damage.

A lot is being done. "Burn and blast"—a prefiring to remove oils and rust preventives, followed by mechanical shotblast cleaning—is proving effective as a cost cutter to replace pickling and washing.

Spray and Fire—Electrostatic spraying has proved to be a fully satisfactory method of applying white enamels, and is excellent for color. Hand and electrostatic spraying produce different shades from the same color batch, which calls for some neat color balancing if they are used together.

Major appliance makers want a one-coat enamel. Some one-coat work has been done successfully with high-opacity white, but industry opinion still favors a ground coat followed by a cover coat for a top-notch job.

One coat or two coats, all enamel must be fired. The low-temperature enamels have even changed the nature of the firing furnace. Operators of radiant furnaces are finding it necessary to convert them to convection heating types which do a better job in the 950 to 1300°F range.

Coming Up — With something new to offer, you can expect porcelain enamel to begin turning up in uncommon places—places like blackboards (or chalk boards) for instance. A lot of new schools have them, and their dark, grainy surface is a good indication that enamel's field is no longer limited to full gloss white.

Familiar uses are due for a color renaissance, and some new household ones — toasters, hardware, window sills—should go places.

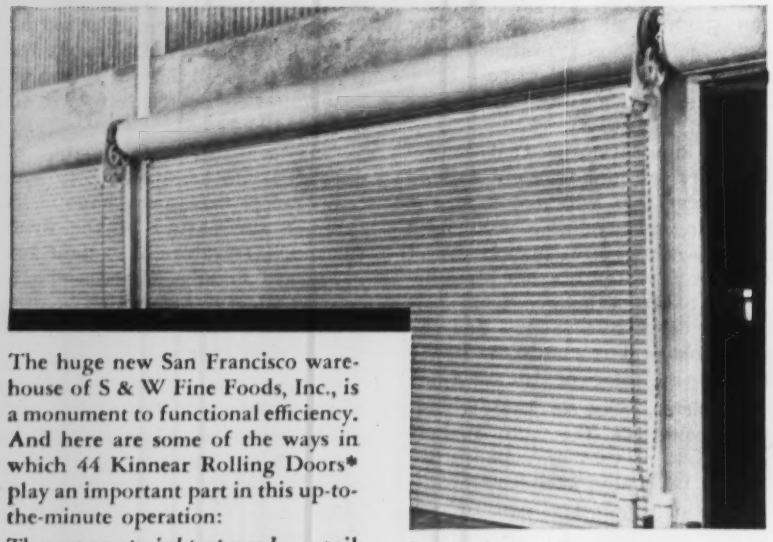
High temperature applications—heat exchangers, manifolds, aircraft engine parts—will keep growing. You could have a porcelain enameled muffler good for the life of your car for an extra $5 on the purchase price, but don't expect to see it.

Just to tickle the imagination, there's porcelain enameled aluminum foil—someone will probably find a use for that.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

44 Kinnear Steel Rolling Doors

Speed Service at S&W Fine Foods —



The huge new San Francisco warehouse of S & W Fine Foods, Inc., is a monument to functional efficiency. And here are some of the ways in which 44 Kinnear Rolling Doors* play an important part in this up-to-the-minute operation:

They open *straight upward* . . . coil smoothly out of the way *above the opening* . . . clear the *entire* doorway quickly — from jamb to jamb and from floor to lintel.

They stay *out of reach* of damage by wind or vehicles.

All floor and wall areas around the doorway are *always* fully usable.

Ceiling space around openings remains clear at *all times*. There's never any interference with cranes, hoists, conveyors, lighting, or other overhead equipment. Goods can be stacked "clear to the rafters" inside or outside the opening.

The tough, flexible, all-steel curtain of interlocking slats assures *long* service, *low* maintenance costs, and *extra* protection against fire, wind, intrusion, and vandalism.

Heavy galvanizing—1.25 ounces of pure zinc per square foot of metal (ASTM Standards) — gives added resistance to weather, wear, and corrosion.

Kinnear Rolling Doors are built any size, for old or new buildings, with motor or manual control. Write for information, or for recommendations on your door needs.

*33 Kinnear Steel Rolling Doors 18'9" wide by 10' high, ten doors 10' wide and 10' high, and one door 6' wide by 7' high.

KINNEAR ROLLING DOORS — Saving Ways in Doorways

The KINNEAR Mfg. Co.

FACTORIES:
1780-1800 Fields Ave., Columbus, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

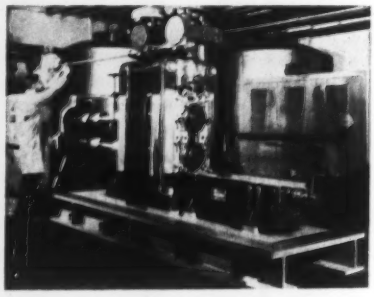
Mill for Atomics

It will roll radioactive materials for nuclear power fuel elements and reactor structures

A NEW rolling mill which is capable of processing all types of nuclear materials rolls flat stock, rounds, squares and ovals.

It was built by Stanat Mfg. Co. Inc., Long Island City, N. Y., for processing pyrophoric materials used in the fabrication of nuclear power fuel elements and structural materials for reactors.

Work—Two units are scheduled for immediate delivery to Argonne National Laboratory, Lemont, Ill., where they will be used principally as experimental mills in the development of processing methods to roll radioactive materials such as plutonium, uranium, zirconium, beryllium and thorium.



ROLLING MILL
. . . can be enclosed in airtight box

The TA-725 is a 2-high 4-high combination rolling mill with work rolls 2½-in. in diameter; backup rolls 10 in. in diameter. It has a maximum rolling load capacity of 600,000 lb at 100 fpm.

Glove Box—The work zone of the Stanat unit can be enclosed in an airtight structure, containing a helium atmosphere. Operation and maintenance would be performed through arm length gloves.

A power-operated roll change mechanism facilitates removal and replacement of various types of rolls within the glove box area. The mechanism provides safe, remote control handling of rolls which are assumed to be contaminated beyond tolerance once they enter the main enclosure area.

USCOLITE PIPE

$10,000-a-year saving with just $450 of Uscolite Pipe"

Rarely can you find a more corrosive environment than that of a tannery. For instance, pipes in one large Minnesota tannery (carrying salt, sulfuric acid, alkali, hard water and chrome liquor) became corroded and had to be replaced frequently, some as often as every week. Also, there was the constant hazard of dangerous chemical leaks. A piping break always damaged the floor, often stopped plant operations.

Then, 2 years ago, they ordered $450 worth of Uscolite® Pipe. Result: savings of $10,000 in just one year.

Similar savings are possible to metal working and metal producing plants where pipe must convey or be exposed to corrosive elements.

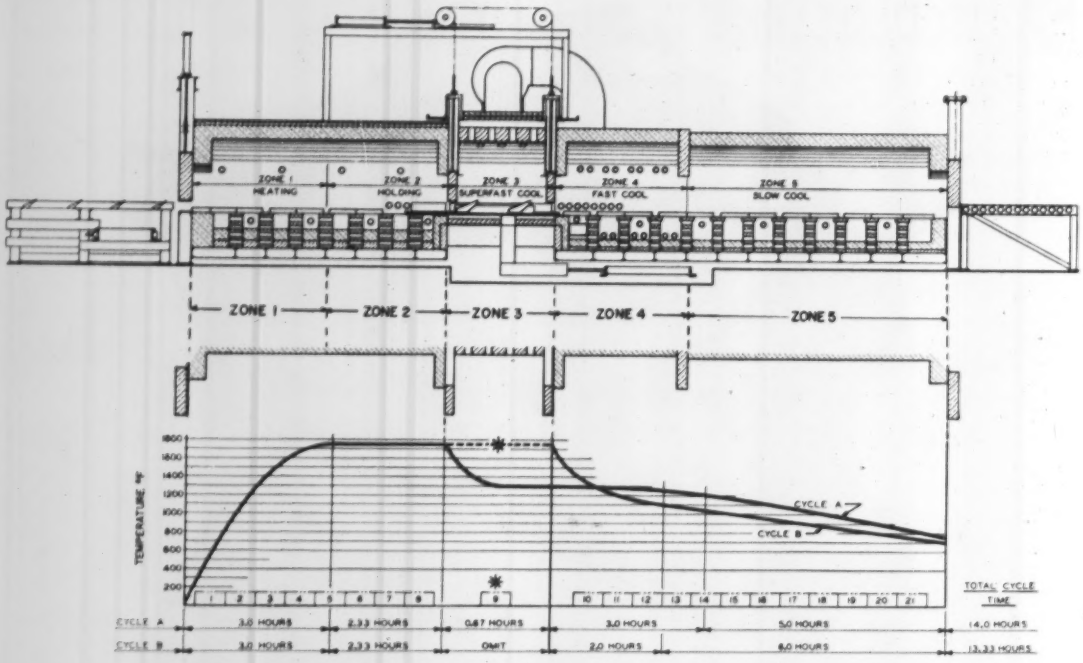
Uscolite plastic pipe is extremely light in weight, yet has very high impact strength. It is resistant to corrosive chemicals and is non-contaminating. The Uscolite line includes everything for a complete pipe assembly, including the Hills-McCanna Valve. Contact any of the 28 "U. S." District Sales Offices, any of the selected "U. S." Distributors, or write us at Rockefeller Center, New York 20, New York.

Watch NCAA football, Saturday afternoons, NBC-TV

After 2 years on the job, note the smooth, unharmed exterior of Uscolite Pipe (at left) while metal pipes are heavily corroded.

Mechanical Goods Division

United States Rubber



Annealing with Superfast Cooling Option

A gear manufacturer wanted a cycle annealing furnace that would continuously handle forgings in a wide assortment of sizes, shapes and alloys. He got it and more

By LESTER E. ALBAN
Assistant Metallurgist
and
HARROLD J. BATES
Superintendent
Metallurgy & Inspection
Fairfield Mfg. Co.
Lafayette, Ind.

CYCLE ANNEALING can frustrate a gearmaker (or other manufacturer) who works with parts that constantly vary in size, shape and grade of steel. Fairfield Mfg. Co., Lafayette, Ind., found itself in this position on the eve of an expansion that called for increased gear production.

Fairfield anneals and normalizes forgings for gears that go into outboard motors, farm equipment, heavy trucks and diesel locomotives — a rather wide range of sizes and shapes. The steels may be lean or rich alloy carburizing, medium carbon or hardening grades. The annealing cycle must result in maximum machinability for drilling, broaching, turning and tooth cutting. Gear blanks must be processed continuously, in large volume.

Sounds like rather a large order, but it is being handled by a single furnace.

Bi-Cycle—The annealing furnace the company ordered from Surface Combustion Corp., Toledo, O., was required to conform to some unusual specifications. Among them were:

1. It had to be capable of at least two separate annealing cycles; one for 8620, 4620 and similar steels, including a superfast cool, and one for 4817, 4820 and similar steels.

2. Each zone had to accurately maintain its own uniform and distinct temperature, without marked thermal flow from one zone to the other.

3. Operation had to be automatic, repetitive and require a minimum of operator attention.

4. The furnace had to handle a 1200-lb charge of mixed forgings weighing from 3 to 450 lb, and ranging from 3 to 20 in. in diameter, and handle bar stock up to 40 in. long.

5. Trays had to be capable of handling work 36 by 40 in. and

Fig. 1—Top: Cross section of Fairfield Mfg. Co.'s annealing furnace with superfast cooling zone. Bottom: Graph of the two typical cycles shown below is superimposed on the furnace plan

	Cycle A	Cycle B
Typical Steels	8620, 4620	4817, 4820
Zone 1—Heating	Heat from cold to 1750° F in 3 hours	Heat from cold to 1750° F in 3 hours
Zone 2—Holding	Soak at 1750°F for 2.33 hours	Soak at 1750°F for 2.33 hours
Zone 3—Superfast Cooling	Cool from 1750 to 1300° F in 20 to 30 minutes. Hold for remainder of pushing cycle (0.67 hour)	By-pass
Zone 4—Fast Cooling	Cool from 1300 to 1200° F in 3 hours	Cool from 1700 to 1100° F in 2 hours
Zone 5—Slow Cooling	Cool from 1200 to 900° F or lower in 5 hours	Cool from 1100 to 600° F in 6 hours
Total Time	14 hours	13.33 hours

adaptable to the transportation of forgings outside the furnace.

Furnace—The design that met specifications can be seen in the illustration. The furnace is 12 x 55 ft. It has five zones for heating and cooling. They're designated as: 1. Heating. 2. Holding. 3. Superfast cooling. 4. Fast cooling. 5. Slow cooling. This unit not only meets the two-cycle specification but provides for additional cycles.

The furnace is heated by natural gas at 28 lb pressure. It operates automatically. Each zone (except superfast cooling) is regulated by recording controllers which actuate motorized gas valves.

The superfast cooling zone is isolated from the rest of the furnace by refractory doors. It is essentially a separate full convection furnace within a direct fired furnace.

Cycle — The cycle begins with the automatic opening of the doors that isolate this superfast cooling zone (zone 3). Two trays move through side by side on six rows of roller rails (or alloy skids in zone 3). An extractor simultaneously moves two trays from zone 3 into zone 4 (fast cooling) and two trays from zone 2 (holding) into zone 3. By using a selector switch, the operator can elect to move trays from zone 2 into zone 4, by-passing zone 3. This pushes zone 4 trays into zone 5, and zone 5 trays onto the cooling table.

The zone 3 doors then close and the charging door opens, permitting the charging pusher to feed trays into zone 1 (heating) and at the same time move zone 1 trays into zone 2.

Zone 3 — Heated air is blown

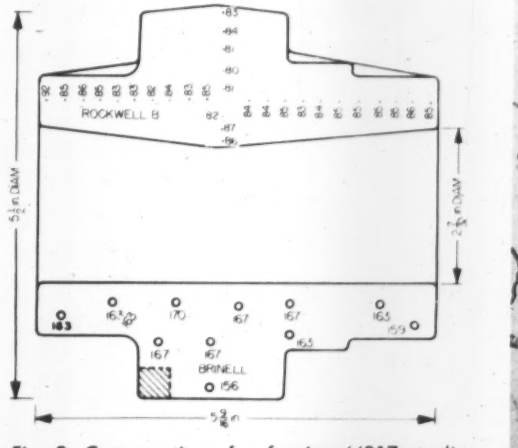
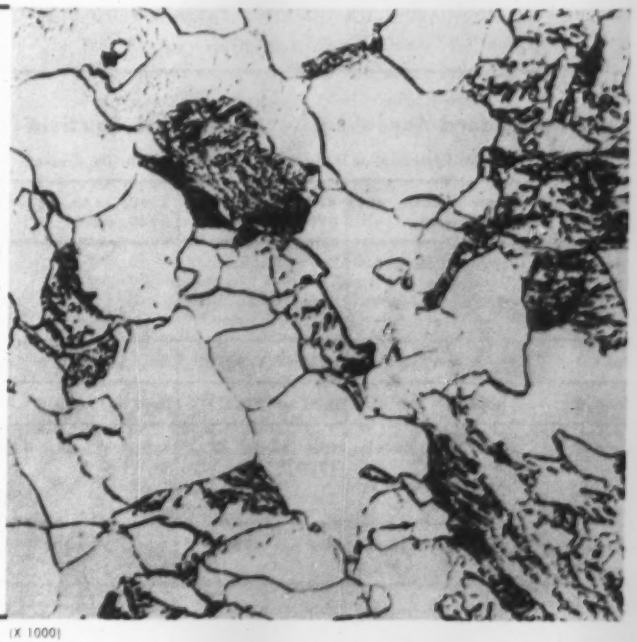


Fig. 2—Cross section of a forging (4817 steel) annealed by cycle 4 (Fig. 3), showing uniformity of hardness. Detail of the shaded portion is shown in the photomicrograph



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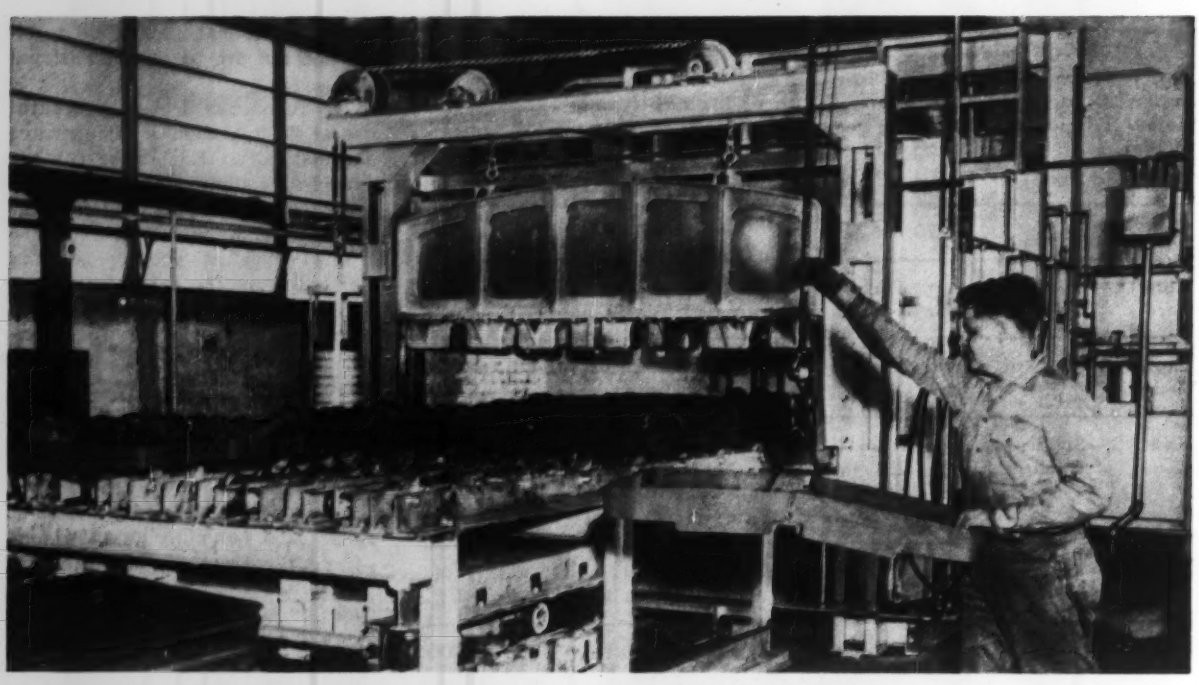


Entry end of the Surface Combustion cycle annealing furnace at Fairfield Mfg. Co. Hinged design of the trays spreads the load over three sets of rollers

into zone 3 through a diffuser, passing around the work and returning to the high temperature fan through a refractory-lined duct. Air is cooled in the duct by finned water coolers, or heated by burners to bring it back to control temperature.

The zone can be used for cycle annealing, by-passed for full annealing, or used for normalizing to bring the temperature down fast through the critical range. Work can be further cooled at a slower rate in the following fast cooling chamber. Work can also be reheated in the fast cooling chamber to a subcritical temperature.

Zone 4—Temperature in the fast cooling zone is maintained by blowing outside air through cooling tubes which exhaust to the outside of the building, or by heating the chamber with open burners. A hanging arch, giving 19 in. of clearance above the rollers, separates this zone from the final slow cooling zone. Air cooled ducts draw down the temperature to the point where the work is cool enough for handling as it emerges from the furnace.

Work coming from the furnace is dumped into a Wheelabrator Tumblast, and the empty trays are returned to the loading station.

Trays—The basic tray is a 35 per cent nickel, 15 per cent chrome alloy casting measuring 18 x 20 in. Two of the castings are normally hinged together to make a single tray that will hold 500 lb. The hinge action spreads the load over three sets of rollers in the furnace.

Four castings can be combined to make a tray 36 x 40 in. which will hold 800 lb. Trays with this construction have a life of three to five years.

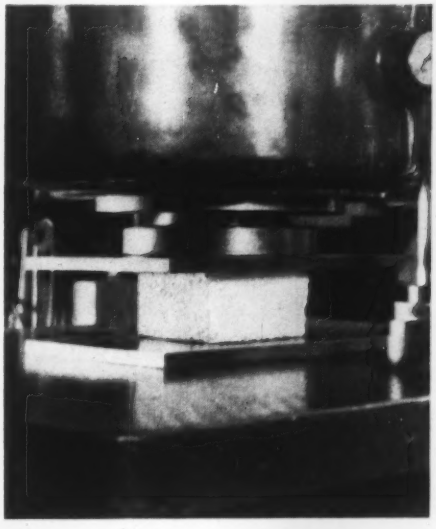
In five years of operation, the furnace has proved its versatility. It has consistently exceeded its rated capacity (1200 lb per hour net, or 864,000 lb per month). It has turned out as much as 1 million lb monthly.

Fig. 3—Standard Annealing Cycles Used at Fairfield

	Cycle 1: Normalize	Cycle 2: Anneal	Cycle 3: Anneal	Cycle 4: Anneal
Steel Grades	Low carbon alloy carburizing	43BV12, 43BV14 43B14, 43B17	1040, 1340, 4140 5140, 8640	4817, 4820 2515
Time Cycle	Single tray—40 minutes Double tray—60 minutes			
Zone 1	Heat to 1750°F	Heat to 1750°F	Heat to 1600°F	Heat to 1750°F
Zone 2	Hold at 1750°F	Hold at 1750°F	Hold at 1600°F	Hold at 1750°F
Zone 3	Cool 20-30 minutes to 1100°F and hold to end of cycle	Fast cool to 1200°F	Superfast cool to 1100°F	Superfast cool to 1250°F
Zone 4	Fast cool to 600°F	Hold at 1200°F	Raise to 1200°F	Fast cool to 1200°F
Zone 5	Slow cool to 300°F and out	Slow cool to 900°F and out	Slow cool to 500°F and out	Slow cool to 500°F and out

Strength...

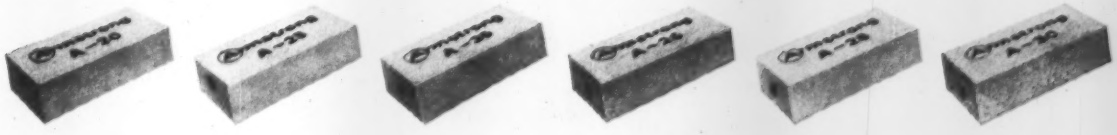
Extra strong for extra long service – Armstrong Insulating Fire Brick



The high strength of these brick greatly lengthens their life. They withstand mechanical abuse, resist wear and erosion by high velocity gases and flame impingement, and allow sound arch and wall construction. Armstrong Brick remain intact in shipment, in the carton or in factory-built furnaces. They have good load-bearing qualities, resist breakage and cracking from heating and cooling stresses. To give efficient as well as long service, this strength is carefully balanced with high insulation value in brick formulation.

Write for free booklet giving full information on the entire line of Armstrong Insulating Refractories. Address Armstrong Cork Company, 2712 Reed Ave., Lancaster, Pa. And if you have any problem involving insulating refractories, call in your Armstrong engineer for expert assistance.

Armstrong INSULATING REFRACTORIES



You're too little to use RANSBURG Electrostatic Spray Painting?

If your production justifies conveyorized painting, chances are RANSBURG NO. 2 PROCESS can do YOUR painting job better . . . at less cost.

RANSBURG NO. 2 PROCESS *accounts for a 50% savings in paint costs in finishing fluorescent lighting fixture parts for* MELROSE LIGHTING COMPANY, *Philadelphia. Melrose is a small plant employing only 25 people.*

Not only big industrial manufacturers like G. E. . . . Whirlpool-Seeger . . . Westinghouse and Republic Steel, but little plants, too, are using RANSBURG NO. 2 PROCESS in their finishing departments to help keep mounting manufacturing costs in line.

A typical example is Melrose Lighting Company, Philadelphia. They make industrial fluorescent lighting fixtures and employ only 25 people.

Formerly, according to F. Homer Hagaman, owner Melrose Lighting, when their fixture louvres were hand sprayed, they painted only 70 pieces per hour. Now, with Ransburg Electro-Spray, he reports they get over 200 per hour.

Production on the fixture end parts jumped from 400 pieces per hour by hand spray to over 2000 an hour electrostatically—a 400% increase!

Along with improving quality of the work, stepping up production, and cutting labor costs, Melrose is enjoying a 50% paint savings.

Let us show you how Ransburg No. 2 Process can lower YOUR painting costs. Write for our new No. 2 Process brochure on electrostatic spray painting. Numerous production-line examples show how other manufacturers are cutting finishing costs . . . increasing production . . . and improving the uniformity and quality of their work with Ransburg equipment.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

Stainless Curtains

New office building will have stainless steel and porcelain enameled curtain walls

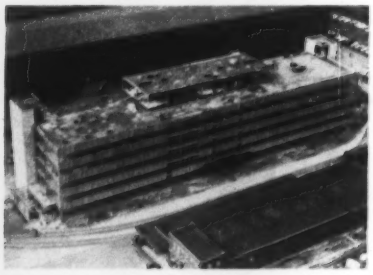
AN architectural first is under construction at U.S. Steel's Homestead District Works, Munhall, Pa.

It's an office building which features the first true stainless steel curtain wall construction. It also boasts the largest porcelain enameled panels (4½ x 12 ft) ever used for architectural purposes.

Advantages — More than 1000 all-steel panels will go into the structure which is five stories high and 331 ft long.

Panels reduce the building's load and wall thickness, cut down on expensive construction time and will be less costly than conventional surfaces to maintain.

Sandwiches—The panels (they are stainless or porcelain enameled on the outside and carbon steel on the inside) serve as the exterior and interior surfaces of the building. They are 3 in. thick; conventional concrete or brick would have to be 9 to 12 in. thick to perform the same functions.



STAINLESS PANELS
. . . on front of new office building

Vertically pivoted and fully reversible windows are an integral part of the curtain wall panels. Fibrous-glass insulation between the two sheets of steel, coupled with a dead air space, helps to maintain even temperatures within the building and makes the wall noncombustible.

The building will be faced with stainless steel on the front and the two sides. Porcelain enameled panels will be installed on the fourth. Homestead plant management and office personnel expect to move in by Mar. 1, 1957.

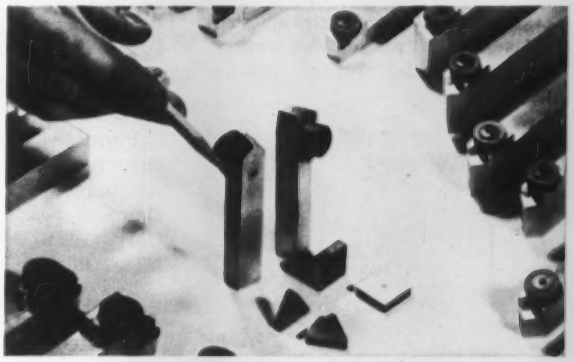
Cadmium Plated Toolholders Resist Corrosion

There are more than 90 styles and sizes in this line of toolholders. They're used with throwaway cemented tungsten carbide blanks.

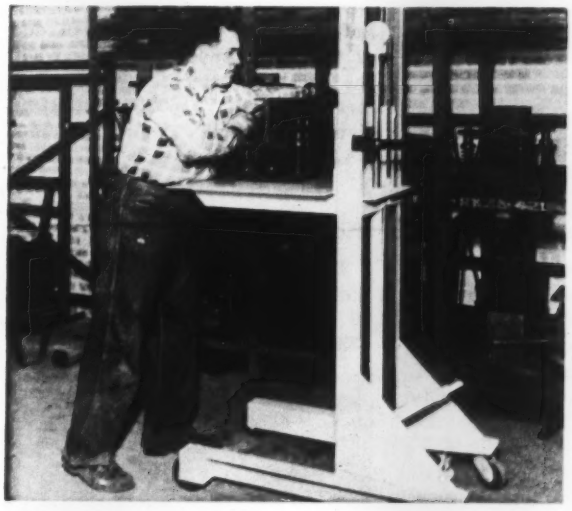
Cutting pressure is exerted in the same direction as the clamp screw. This screw (a special one with recessed heads at both ends) is accessible from both top and bottom of the holder—an advantage when using a rear tool carriage.

The carbide tips are easily indexed to a new cutting surface while holding the tool location.

All the toolholders have replaceable carbide chip breakers. *Write*: Carmet Division, Allegheny Ludlum Steel Corp., Room 2036, Henry W. Oliver Bldg., Pittsburgh 22, Pa. *Phone*: Court 1-5300



Portable Elevator with All-Welded Steel Frame Lifts 750 Lb.



Pressure of the operator's foot powers this hydraulic elevator. It rolls easily on antifriction bearings.

A large oil reservoir is built into the base superstructure. Oil wipers are at the top of the ram and an overflow tube leads back to the reservoir. O-rings are used in the pump and ram units for smooth control.

The lift has a sturdily constructed all-welded steel frame.

Over-all height of the unit is 83 in.

It has a lifting height of 71 in. and a 24 x 24 in. platform.

Weight has been saved through the elimination of the conventional lift mechanism. The unit weighs about 270 lb.

Uprights and platform forks are constructed of 3-in. channels that weigh 4.1 lb per foot. *Write*: Barrett-Cravens Co., 628 Dundee Rd., Northbrook, Ill. *Phone*: Northbrook 2300

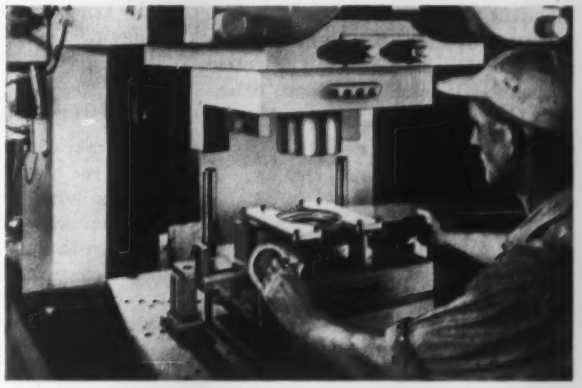
Safety Device for Presses Prevents Repeating

The Saf-Strok Control prevents air, electrical or mechanical failure of a press from causing the slide to continue to stroke, even though run buttons have not been depressed.

The key device in the safety circuit is a limit switch which is activated if the press crankshaft goes beyond its normal stopping point.

When the crankshaft overtravels, the control system exhausts air from the clutch and brake. This disengages the clutch and engages the brake, stopping the slide instantly.

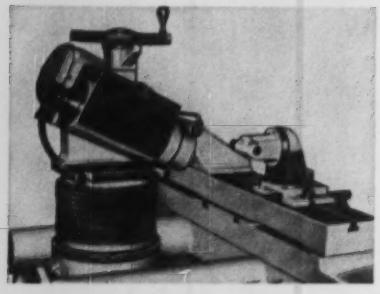
Once the slide has been stopped, a red light goes on, and the press cannot be operated until a button is pressed. *Write*: Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill. *Phone*: Portsmouth 7-8700



NEW PRODUCTS and equipment

Tool Grinder

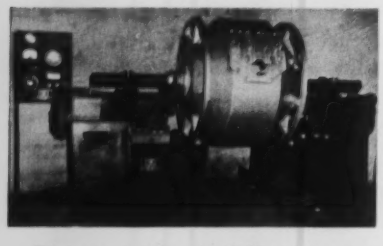
The 25-degree tilting spindle on the Sterling G-2 tool and cutter grinder provides direct, positive setting of clearance angles without the use of formulas. The spindle is reversible and rotates 360 degrees.



The machine has a 10¾-in. swing and an antifriction table with dual controls. *Write*: McDonough Mfg. Co., Eau Claire, Wis. *Phone*: Temple 2-6636

Rocking Furnace

The P series of indirect arc furnaces has automatically controlled, motor driven electrodes. They also can be moved by manual pushbutton controls.



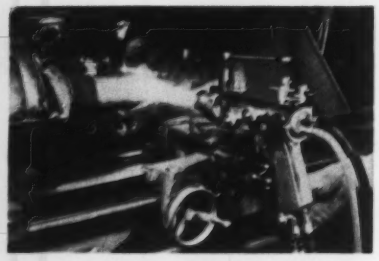
The magnetic amplifier arc control influences the control motor so that its speed is directly proportional to unbalance.

Capacities range from 350 to 4000 lb. *Write*: Detroit Electric Furnace Division, Kuhlman Electric Co., Bay City, Mich. *Phone*: Twinbrook 5-5541

Metal Spraying

Hard-facing alloys are applied to most types of steel (including stainless), cast iron and copper with the C-2 Spraywelder.

The unit also sprays powdered aluminum, zinc, copper, nickel,



stainless steel, brass, lead and high temperature brazing alloys.

Powdered alloys are sprayed on, then fusion bonded to the part by heating with an oxyacetylene flame. *Write*: Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. *Phone*: Twinbrook 3-3800

Torque Wrench

A responsive sensing element in the release mechanism of this power torque wrench enables it to run self-tapping screws.

After being set for a given torque, the wrench starts the rundown without impacting or ratcheting. During the continuous rundown, it senses the tightness of the screw thread or other resistance and adds that value to the final setting torque.

The units are adaptable to drill presses for jig assembling of screw fasteners, and multiple mounting in special gang arrangements on nut - setting machines. *Write*: Ohlsson & Rice Inc., 3340 Emery St., Los Angeles, Calif. *Phone*: Angelus 1-8196

Water-Cooled Molds

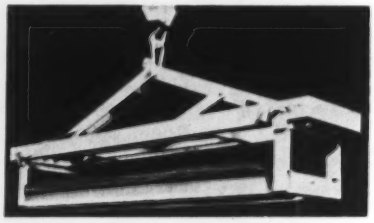
It takes 4 minutes, from pour to wire bar, to cast nonferrous metals with the Free Easy mold.

Other advantages: It provides a fine grain finish, eases and speeds bar removal, reduces mold maintenance and virtually eliminates seal blowouts.

A water cooling channel runs the full length of the mold. Models are adaptable to pulled or dropped systems. *Write*: Kruger Machines Inc., 545 Grove Ave., Woodbridge, N. J. *Phone*: Woodbridge 8-0017

Storage Racks

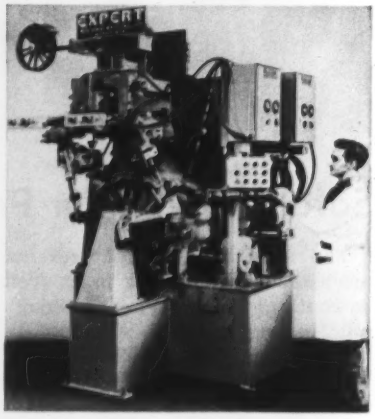
Sheet steel of various widths can be handled and tiered with these portable racks. They have reinforced crossbars welded to the frame which permit the sheets to nest snugly.



The flush bottom racks are picked up with automatic tongs suspended from an overhead crane. Safety strips welded at each end of the rack prevent slipping when the racks are tiered. *Write*: Palmer-Shile Co., 16025 Fullerton, Detroit 27, Mich. *Phone*: Vermont 6-4400

Index Welder

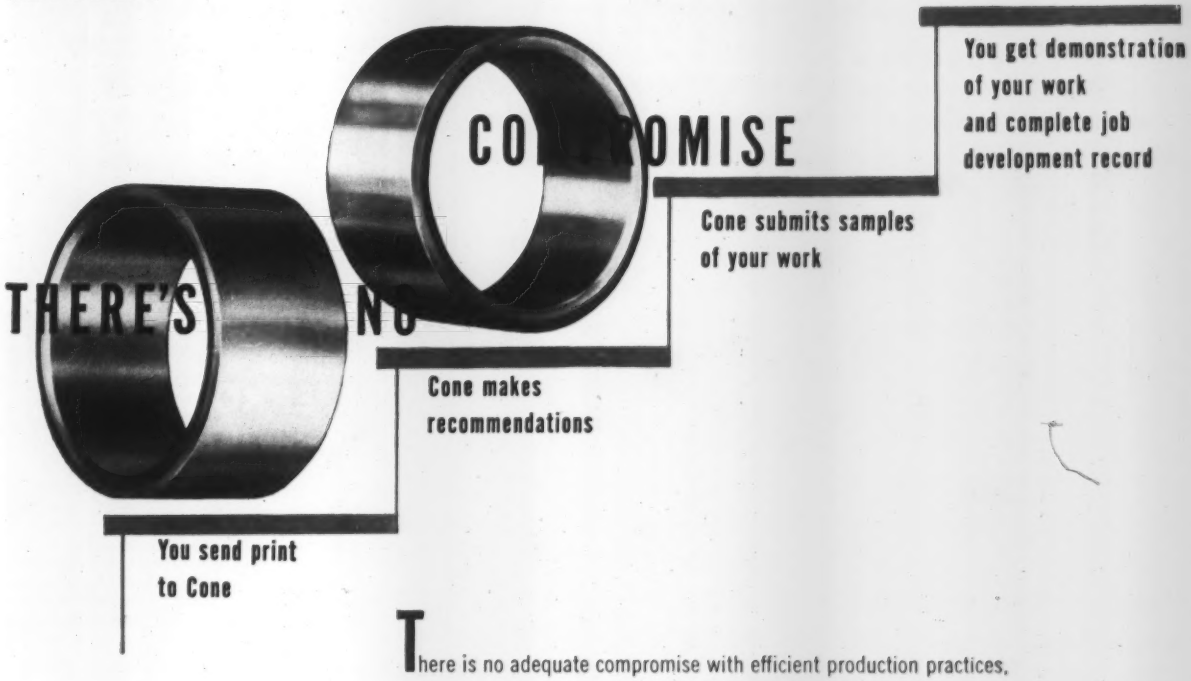
This eight-station machine uses the CO_2 shielded arc method. At 80 per cent efficiency, it produces 433 bracket assemblies an hour.



The automated machine has a trunnion-type index mechanism operated by a cam index drive enclosed in the base. Eight clamping fixtures mounted on the trunnion rotate about a stationary cam.

Welding wire is fed to two heads by roll feeders. Current is sup-

No. 6 in a series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You get demonstration of your work and complete job development record
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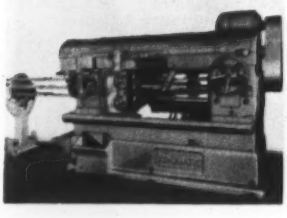
There is no adequate compromise with efficient production practices, if you are in business for a profit.

But you don't always know just how competitively efficient your equipment is. Case histories of what the other fellow is doing are sometimes garbled. At least the poor ones are not advertised. And conditions vary in all plants. Sometimes you have reason to be more concerned with what you don't want in new equipment than with what you do want. Cone believes too much is at stake for a machine to go into a line unequipped for the job, with either carbide or hss tools.

The Conomatic Carbide Development treats each job individually from standpoint of work, machine, tools, and operating personnel.

DATA FOR COMPARISON

Part	Bushing	Length	⅜"
Machine	1⅝" Conomatic	Hole Dia.	1¼"
Tools	100% Carbide Tipped	RPM	825
Material	8620	Time	14.8 Secs.
Stock Size	1⅝"		



Conomatic

For particulars send for "Four Steps With Cone"

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

57 VARIETIES boiled down

L. A. Edwards

ASST. SALES MGR., THE CINCINNATI GEAR CO.

We could pass ourselves off as the Heinz of the Gear Industry by naming at least 57 different varieties of gears that we manufacture — but to be more concise, the gears we produce can be listed in eleven *basic* categories: spur, helical, rack, worm, herringbone, bevel, spiral bevel, internal, sprocket, Zerol* and Coniflex* (*Reg. U.S. Pat. Off.). This is still a pretty impressive list, we think, and covers just about all types in current demand for industrial use. Of course there are many variations within these basic types, too — such as a hypoid gear, which is basically a spiral bevel gear.

If you're one who has always thought that "gears is just gears," it will pay you to find out just what advantages each of these types has to offer. For instance, a straight bevel gear might perform *adequately* in an application that *ideally* calls for a Zerol gear; but fine points such as this can make the difference between *adequate* and *superior* results from your product. Your Cincinnati Gear Representative can cite advantages for the different gear types, and perhaps give you some ideas for applications in your products that you may have overlooked. And after the "right" gear has been chosen for your application, we can produce it for you — not only the right *kind* of gear, but with the "right" *quality* and *service* to assure your becoming another of our many satisfied repeat-order customers.

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"Gears—Good Gears Only"

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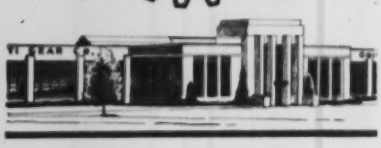


NEW PRODUCTS and equipment

plied by two 600-amp rectifiers. *Write*: Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

Turret Drill

Model A-50 does consecutive drilling, reaming, counterboring and tapping operations in large circular patterns.

The table holds rotary fixtures up to 48 in. in diameter. The turret carries six spindles which work on a common axis and are indexed into position as required.

Speed, depth and reversals for tapping are preset for each spindle and repeat automatically as the turret is indexed.

The workpiece is loaded in a rotary fixture and indexed from one hole to another. All operations are performed at each hole location by indexing the turret.

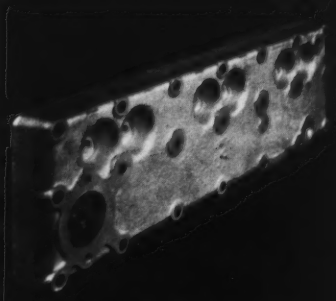
The quill provides 6 in. of travel. The head is adjustable through 15 in. *Write*: Howe & Fant Inc., 20 Fitch St., East Norwalk, Conn. *Phone*: Temple 8-3448

Locknut

The Two-Way nut has its locking power in the body, not at the crown. Because the nut is double chamfered and will start from either end, it can be fed and run on automatically.

During manufacture, pressure is applied on opposite sides of the nut. This gives opposing thread

BORES MOTOR BLOCKS 22% FASTER— AND WITH 28% LESS TOOL WEAR



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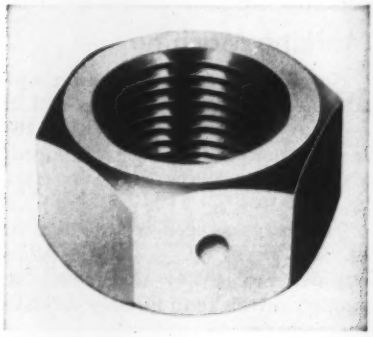
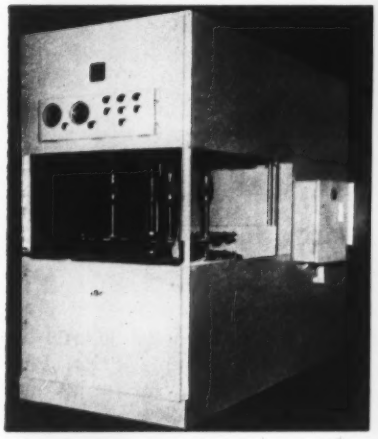
deflection, as well as an ovalizing in the center but not at the end of the thread.



The nut locks when bolt ends are flush with the nut, or even when all the threads are not used. *Write*: MacLean-Fogg Lock Nut Co., 5535 N. Wolcott St., Chicago, Ill. *Phone*: Edgewater 4-8420

Mechanical Finishing

Brass, zinc and aluminum die-cast parts are prepared for plating by the Spin-Finish machine.



In a single operation, it finishes multiples of up to four parts in 4 to 16 minutes. One compound is used for all shapes and sizes. *Write*: Grav-i-Flo Corp., Sturgis, Mich.

Sheet Copper

The ripple pattern on these 36 x 96-in. copper sheets produces highlights and shadows.

They come in the standard 16-ounce weight and are suited for

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Acco Registered* Sling Chains
NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.

*Trade Mark Registered

New X-weld Chain— New Master Link

• The best has been made even better! ACCO *Registered* Sling Chains, recognized everywhere as the finest sling chains on the market, have now been made *still stronger and safer* by incorporating ACCO's great new Accoloy X-weld 125 chain and ACCO's new Shaped Section Master Link.

The Accoloy X-weld 125 chain is non-kinking. Each link has an oversize welded area with welds of full alloy strength. This means extra ruggedness and longer service life. The new Shaped Section Master Link weighs no more, but it withstands deformation under loads up to 18% greater than a conventional round section can.

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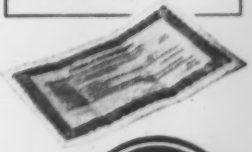
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling



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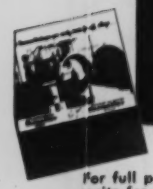

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interior and exterior uses. *Write*: Chase Brass & Copper Co. Inc., 236 Grand St., Waterbury 20, Conn. *Phone*: Plaza 6-9444

Marking Machine

No. 710 performs marking operations that require up to 8000 lb pressure. Up to four lines of 1/16-in. characters can be stamped. Maximum lettering length is 3½-in.

The machine occupies an 18 x 20 in. space. Table and die slide strokes are easily adjusted. A single control knob quickly adjusts the pressure.

Production capacity is 800 to 1000 parts an hour. *Write*: Parker Stamp Works, Hartford, Conn. *Phone*: Chapel 6-1651

Vacuum Pumps

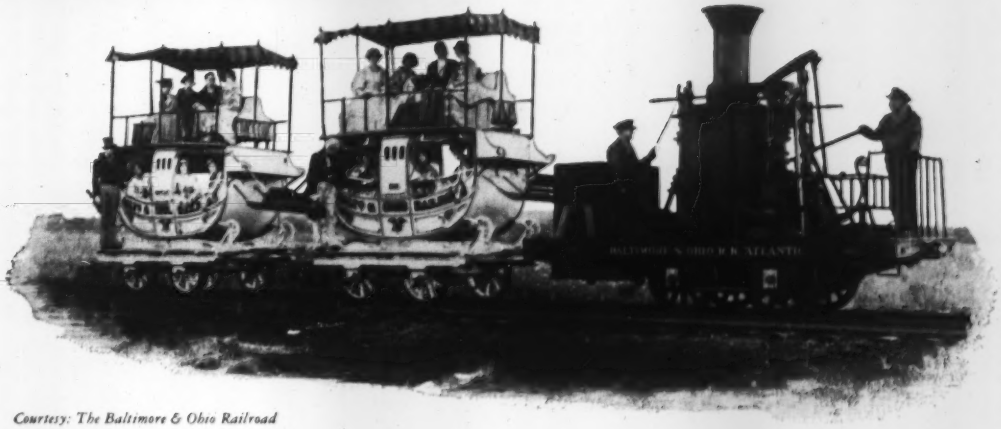
Series 4700 mechanical booster pumps come in six sizes (1000 to 12,000 cfm). They operate at top capacity at pressures of 5 to 2200 microns.

Oil is not used as a pumping medium or as a sealant in the high vacuum system.

The high vacuum (or low pressure) stage is a high capacity, positive displacement blower. Two impellers turn at high speed in op-

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

HAND IN HAND THEY GREW...



Courtesy: The Baltimore & Ohio Railroad

As the need for heavier railroad rails grew, so did the iron industry. The first railroads began with wooden rails which were iron-topped. It was not until 1844 that "heavy", entirely iron rails went into production at the Mt. Savage Rolling Mill in Allegheny County, Maryland. It was 21 years later, in 1865, when the first steel rail was rolled from a Bessemer ingot at the North Chicago Rolling Mill Co.

One of the first "iron horses" to snort flame, belch smoke and cinders, and scare livestock was the "Atlantic". Built in 1832 by Phineas Davis in York, Pennsylvania, the "Atlantic" was placed into operation by the Baltimore & Ohio Railroad. In 1835 the "Atlantic" led a procession of trains into Washington, D. C.

As have the railroads and the iron and steel industries grown, so has BAKER'S MAGDOLITE, the original dead-burned dolomite. By continually improving their product through constant testing, today BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Economy, Strength, Quality. Specify BAKER'S MAGDOLITE, the original dead-burned dolomite, the next time you need dolomite.

6-55

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by A. B. HOEFER
Vice-President
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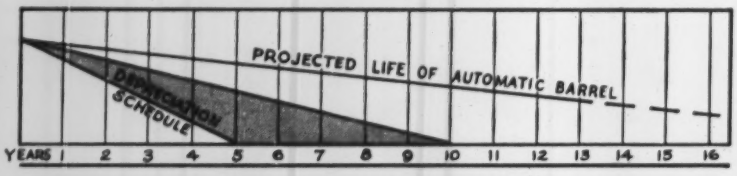
IT'S GOOD TO KNOW WHEN YOU ARE INVESTING in a plating machine that Stevens units can be designed so that more than one type of plating can be done on one machine. Also, that changes can be made in the future to meet any specifications you may have. We've changed over a good number of Stevens machines in our time. That's why there are so many Stevens machines in use far beyond their depreciation schedule.



THERE ARE MANY OTHER SAVINGS you can enjoy beyond long life. Stevens Automatic Barrel machines require only one employee to operate the machine. These units are completely automatic, because the open end barrel is loaded when in a vertical mouth-upward position and automatically unloaded by tilting the barrel downward. There are no lids to fasten or unfasten.

POSSIBLE MIXING OF PARTS IS ELIMINATED in the Stevens automatic barrel. Small, special loads can be conveniently run without penalizing the productive capacity of the machine and without the inconvenience of partitioned cylinders. Stevens Automatic Barrel Machines are used for varied processes that include copper strike; copper, nickel, tin, brass, zinc and cadmium plating; phosphating; alrocing; dichromating; cleaning and bright dipping.

THE SIMPLE COMPACT DESIGN of this machine permits production capacities as high as 4,000 pounds per hour. Simplicity of design makes it equally practical to distribute the capacity between two or more machines to provide flexibility in plating thicknesses and production.

Let us give you more details on Stevens Automatic Barrels. Write us today, Frederic B. Stevens, Inc., 1814 Eighteenth Street, Detroit 16, Michigan.

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posite directions to compress the gas smoothly and move it to the high stage, a rotary gas ballast pump. Here the gas is further compressed and discharged to the atmosphere.

Helical timing gears maintain the proper relationship between the impellers. The low and high stage units are mounted on separate bases to permit the installation of interstage condensers, filters, traps or valves. *Write*: NRC Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass. *Phone*: Decatur 2-5800

Fork Lift Truck

Model FGH-40 is a pneumatic-tired truck powered by a 48.2-hp gasoline engine. Its capacity is 4000 lb at a 24-in. load center.

Loaded speed is 9.5 mph. There are two speeds forward and two in reverse. Power steering is standard.

The truck is 85¾-in. long, and its turning radius is 79 in. *Write*: Baker-Raulang Co., Box 5579, Cleveland 1, O. *Phone*: Olympic 1-3000

Anchor Plates

Model NSFA-114 plates are used with heavy duty steel strapping to prevent movement of loads in boxcars.

The plates are used in cars having nailable steel flooring, on floors reinforced with perforated steel plates and in ordinary boxcars where strapping must be at-

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(and we hope you do)

... you'd see skilled craftsmen like these—men who are helping produce top-quality Wickwire Rope, Slings and Strand. You'd find:

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the **CLOSER OPERATOR,** who skillfully fabricates the wire rope

the **METALLURGIST,** who certifies that the wire has the proper physical and chemical properties

the **SALES ENGINEER,** who's always ready to help you

and ***many others*** like them who are constantly working to keep Wickwire in its position of leadership in the production of top-quality products.

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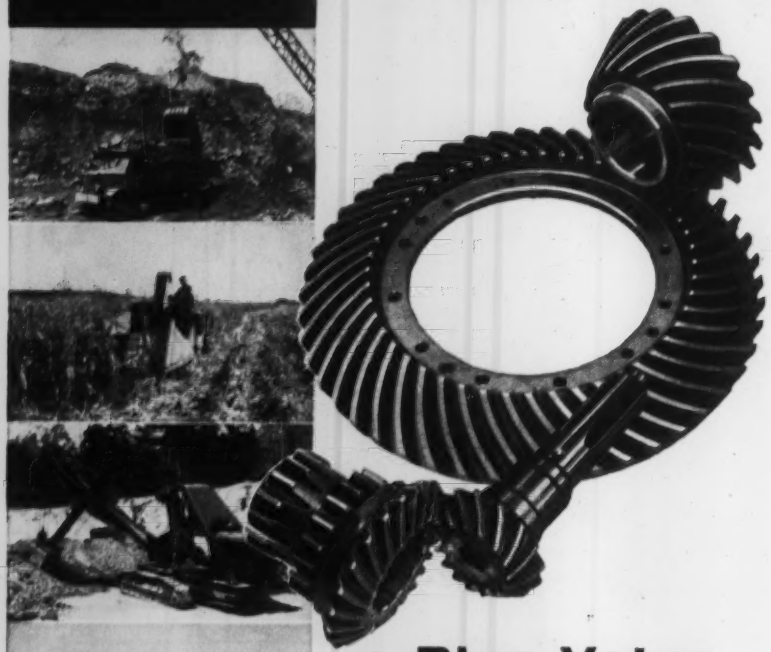

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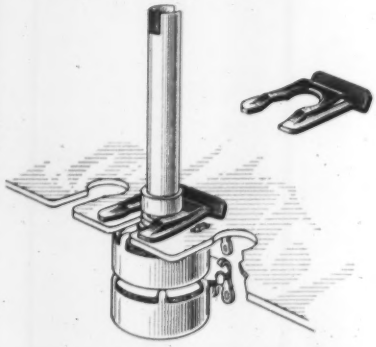
NEW PRODUCTS and equipment

tached to the wall at an angle. *Write*: Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill. *Phone*: Armitage 6-8500

Fastener

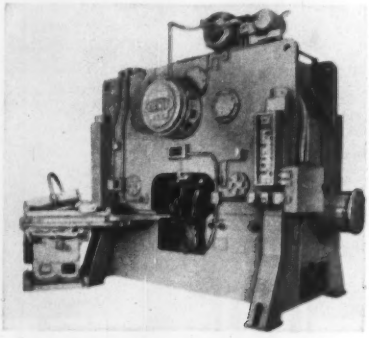
The Speed Clip permits fast, simple assembly and eases the alignment of a tuning shaft on television receiver bases.



The U-shaped clip has arched fingers which provide live spring tension. *Write*: Tinnerman Products Inc., 8700 Brookpark Rd., Cleveland, O. *Phone*: Shadyside 1-9300

Extruding Machine

This 100-ton mechanical press extrudes piston pins (about 4¼-in. long) for truck engines.



The hopper supplies short lengths of bar stock to the feeding mechanism for extruding to size, including inside diameter and length. Two slides are used to exert the horizontal pressures needed. *Write*: Danly Machine Specialties Inc., 2100 S. Laramie Ave., Chicago 50, Ill. *Phone*: Bishop 2-1800

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Sil-O-Cel 16-L for temperatures to 1600F back-up or exposed
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NEW Literature

Write directly to the company for a copy

Carbide Tools

Catalog 956, 50 pages, depicts over 700 carbide and carbide tipped tools. Nelco Tool Co., Manchester, Conn.

Sheet Separators

Bulletin B1056, 4 pages, describes a permanent magnet unit used to separate steel sheets (including laminations). It induces a field in the stacked material. E. V. Nielsen Inc., 129 Broad St., Stamford, Conn.

Zinc Diecastings

This 32-page booklet for machine operators discusses factors involved in the production of sound castings. Henning Bros. & Smith Inc., 91-127 Scott Ave., Brooklyn 37, N. Y.

Fork Truck

This 4-page bulletin describes an electric powered truck with a capacity of 6000 lb. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

Gear Pump

This 14-page bulletin lists specifications of rotary gear pumps in sizes from ¼ to 146 gpm. Department 106, Northern Ordnance Inc., Columbia Heights Station, Minneapolis, Minn.

Gas Analysis

Instruments for evaluating the thermal conductivity method and developing sampling systems are described in bulletin GMH 9-56, 4 pages. Gow-Mac Instrument Co., 100 Kings Rd., Madison, N. J.

Lubricant Additive

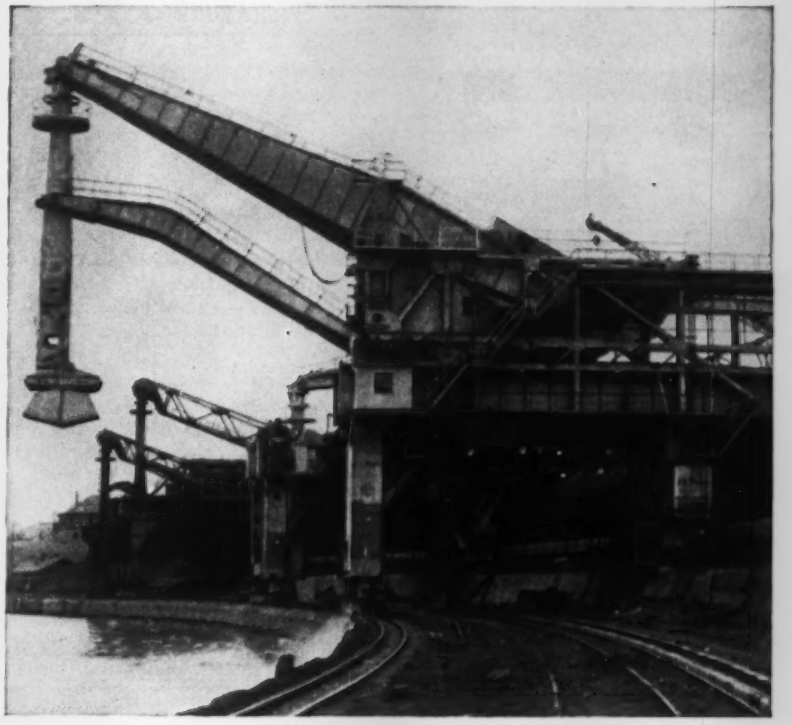
This 12-page bulletin, Lu-6, tells how the addition of molybdenum disulphide lowers wear rates of metal surfaces, increases load capacities and extends the life of lubricants. Department L, Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

Weighing Systems

Bulletin 561, 12 pages, shows arrangements of tank and bin weighing systems. A. H. Emery Co., New Canaan, Conn.

Metal Finishing

This 12-page bulletin describes polishing and grinding wheels for use on floor lathes and semiautomatic



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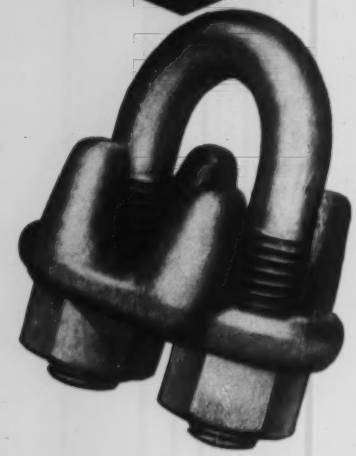

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NEW LITERATURE

and fully automatic polishing machines. Department F6-308, Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

Rectifiers

Application information on a series of small high-current silicon rectifiers is given in bulletin ECG-148A, 11 pages. Semiconductor Products Department, General Electric Co., Electronics Park, Syracuse, N. Y.

Refractory Castables

This 4-page bulletin lists instructions for mixing, pouring, curing and drying refractories used for high temperature service and lightweight insulation. Walsh Refractories Corp., 101 Ferry St., St. Louis 7, Mo.

Cutting Oil

Bulletin 48, 2 pages, describes a transparent, heavy duty oil used in the production of threads on high alloy steel tubing. Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

Tube Fabrication

Bulletin 1140, 24 pages, describes hand tools, tube cutters, flarers, benders (including bench-mounted types), power flarers, straight thread tapping and counter boring tools. Tube & Hose Fittings Division, Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, O.

Center Micrometer

Bulletin 652-A, 4 pages, describes a tool that gives direct reading of the center distance between holes, regardless of their size. Sorensen Center-Mikes Inc., 264 Kossuth St., Bridgeport 8, Conn.

Slotted Angles

This four-page booklet tells how slotted steel angles are used in the construction of storage racks benches and similar equipment. Flexangle Corp., 278 Park Rd., West Hartford 7, Conn.

Screw Machine Products

This 4-page bulletin describes products made of tough alloys, including stainless steel, Inconel, nickel and titanium. Allmetal Screw Products Co. Inc., 821 Stewart Ave., Garden City, L. I., N. Y.

Generator Sets

Stationary, portable and trailer mounted engine-generator sets with 150 to 600 kw are described in bul-

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NEW LITERATURE

letin 1083. Stationary diesel engines with 215 to 1025 brake horsepower are described in bulletin 108. White Diesel Engine Division, White Motor Co., Springfield, O.

Metal Cleaning

Spray washers, rotary drum washers and agitating, pickling and drying units are described in a 4-page bulletin. Solventol Chemical Products Inc., 15841 Second Blvd., Detroit 3, Mich.

Gears and Pinions

Combinations of gears, pinions, hubs and shafts made of die-cast zinc are tabulated in this 4-page bulletin. Gries Reproducer Corp., 400 Beechwood Ave., New Rochelle, N. Y.

Production Brazing

Bulletin TIS 2635, 9 pages, examines the influence of brazing procedures on production costs. Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N. Y.

Casting Design

Here's a 64-page manual that tells how casting design is affected by foundry practice. Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.

Plug Valves

This 28-page bulletin 39, section 5, describes lubricated valves for 150 lb of steam pressure. Homestead Valve Mfg. Co., Coraopolis, Pa.

Seamless Tubing

Small tubing and tubular components are covered in a 4-page bulletin. Uniform Tubes Inc., 1200 Level Rd., Collegeville 2, Pa.

Refractories

Properties of 19 standard refractory bricks are given in bulletin RB-20, 8 pages. Richard C. Remmey Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

Hydraulic Fluids

This 16-page bulletin, F-40134, discusses advantages and limitations of water-base, fire-resistant hydraulic fluids. Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.

Wire Handbook

Nearly 100 types of steel wire are described in this 120-page book. Pittsburgh Steel Co., 1825 Grant Bldg., Pittsburgh 22, Pa.

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STEEL
December 3, 1956

Market Outlook

RISING government requirements will tighten the squeeze on supplies of certain steel products in the first quarter.

The Suez crisis is stimulating demand for tanker plates and related ship steel items, as well as tubular goods for oil well drilling and transport. First quarter military needs will go up slightly. Chiefly involved are alloy and stainless steels, wire products, aluminum and nickel alloys.

HEAVIER SPENDING— Federal outlays in the coming fiscal year are expected to rise noticeably, with some $2 billion of the increase likely to be on military account. In the event world political conditions continue to deteriorate, expenditures will probably be still greater.

First quarter, 1957, military requirements for steel will be up, compared with those of the like period this year. Alloy needs are expected to rise 2 per cent, stainless steel, 12 per cent, wire products, 9 per cent, aluminum, 2 per cent.

BIG TANKER PROGRAM— The Maritime Commission is considering a program which calls for the building of 104 tankers—including three of 100,000 deadweight tons each.

Defense needs have first call on steel production. Any increase in government directives will immediately tighten those items already in the scarce category. But government controls are not likely to be stiffened in the immediate future.

TERRIFIC PRESSURE— Plates and shapes, long in desperately tight supply, are certain to become even more stringent as the weeks pass. Demand pressure from car builders for plates is terrific. Because of congestion in the supply of structurals, much proposed building is being delayed, and some work is being diverted to reinforced concrete construction. As a result, congestion is building up in reinforcing steel.

If anything, supplies will get worse before they get better. An eastern plate mill goes down for modernization at year's end and will be out of production until March.

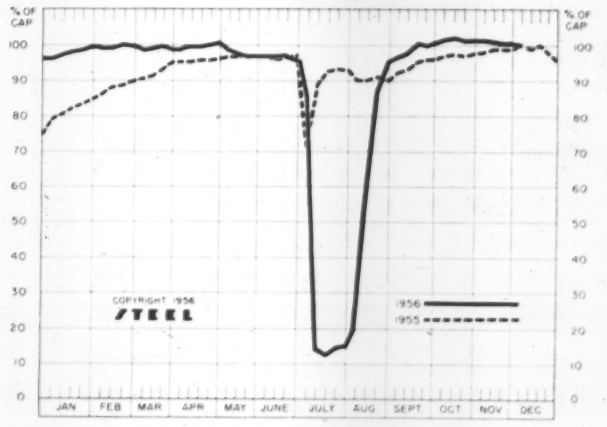
PRICES HEADED UPWARD— The uptrend in the cost-of-living index practically assures a wage increase of at least 3 cents an hour for most of the nation's steelworkers in January. Cost-of-living adjustments (made twice annually) are provided in the three-year no-strike labor agreements signed last summer.

This means intensification of the upward pressure on the steel price structure. Currently, STEEL's finished product price composite holds at $137.66.

SCRAP SOARING— Scrap prices are under strong upward pressure. Last week, No. 1 heavy melting steel went up sharply at several points—notably Pittsburgh, where the advance averaged more than $5 a ton above brokers' recent covering prices, and about $9 above the last purchase by U.S. Steel Corp. a month ago. STEEL's composite is a record $64.67.

The higher scrap market reflects the approach of winter, heavy exports and (principally) the strong demand attending continued high-level steel production. Last week, the national ingot rate slipped ½-point to 100 per cent of capacity, but operations promise to continue in the stratosphere in the months immediately ahead.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 2	Change	Same Week 1955	Same Week 1954
Pittsburgh	95.5	— 0.5*	99	78.5
Chicago	100.5	— 0.5*	97.5	91
Mid-Atlantic	101	— 1	99	72
Youngstown	101	— 3	100	86
Wheeling	102	— 0.5	102	90.5
Cleveland	102.5	— 1.5	96	89.5
Buffalo	107.5	0	80	100
Birmingham	94.5	— 1	94	64
New England	80	— 5	88	70
Cincinnati	95.5	— 0.5	92.5	71.5
St. Louis	102.5	+ 2.5	101.5	83
Detroit	102	+ 1	100.5	80
Western	105	— 2	103	84
National Rate	100	— 0.5	100	81

INGOT PRODUCTION‡

	Week Ended Dec. 2	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	153.7†	153.3	155.2	146.7
NET TONS (In thousands)	2,469†	2,463	2,493	2,356

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 73 Technical Outlook—p. 119

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Transducer (sensing head) is actuated by presence of magnetic materials over a wide range of sizes, shapes, weights, roughness, speeds

No moving parts. No metal-to-metal contact required for operation

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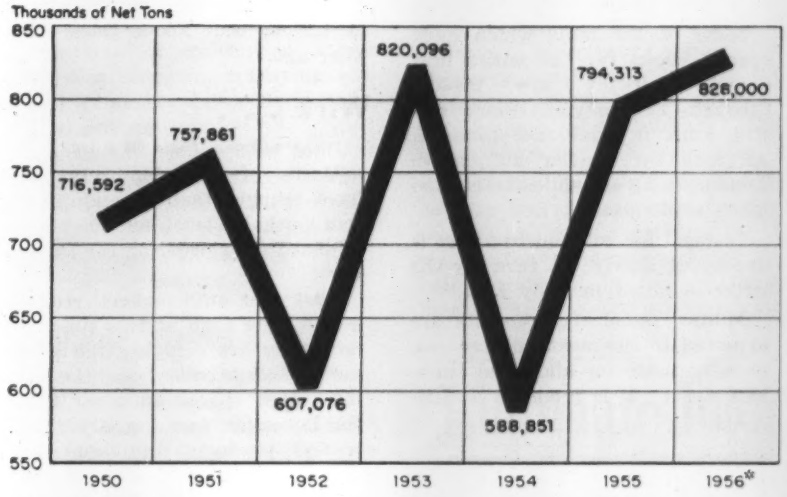
SQUARE D COMPANY

Silicon Steel: A Record in '56

(Shipments)



*Estimated by STEEL.
Source: American Iron & Steel Institute.

Supply, Demand in Balance

While orders for electrical steel are firm, there is no mad rush to get on the books. Completion of expansion programs will help producers meet long term needs

WITH consumption of electricity doubling every ten years, suppliers of silicon steel to the electrical industry say it's only a matter of time before they break their 1953 production record. They may set a new mark this year, despite the month-long steel strike.

Fast Pace—Shipments in first nine months of 1956 totaled 604,311 tons, an increase of 20,000 tons over those in the similar 1955 period, although steelmakers lost over a month of production.

If producers maintain their first quarter average (when shipments were unaffected by inventory building), they will ship 828,000 tons this year. American Iron & Steel Institute statistics show they shipped 790,315 tons in 1955—only a shade below the record 820,096 tons in 1953.

Uses—Producers of heavy electrical equipment use silicon sheets in the cores of generators and transformers. The product is vital in motors and electronic and communication equipment. Grain-oriented silicon steels (the flow of magnetic force is concentrated in one direction) find uses in transformers and turbine generators. These steels are in shorter supply than nonoriented grades. They make up about 25 per cent of all silicon steel production.

Future Uses—"The recent high cost of copper resulted in some revision of motor and generator design, with more usage of electrical steel," comments a sales manager of Armco Steel Corp., Middletown, O. Growth in applications may come from radio and television sets and integral motors.

Producers of heavy electrical equipment take the bulk of silicon sheet production. Steelmakers are drawing expansion plans to meet their needs. Here's the way new capacity plans are developing:

U. S. Steel Corp. is installing ten annealing furnaces at Vandergrift, Pa. They'll be available early in 1957.

Allegheny Ludlum—This firm devotes more than half the production of its new cold-rolling mill at Brackenridge, Pa., to meet the "firm demand for silicon steel."

Republic Steel Corp. is adding to its annealing furnaces in Warren, O. It has 17 furnaces completed and will finish installation of six more in the first quarter of next year.

New Product—Wheeling Steel Corp. will have a new continuous annealing furnace in full operation in the first quarter of next year at Beech Bottom, W. Va. Say company officials: "We are beginning production of grain-oriented silicon on a pilot plant scale. This furnace also enables us to join the trend to shipping cold-reduced electrical steel in coils."

More silicon users are demanding coiled stock, although several producers continue to operate hand mills. "Users appreciate ease of handling and fabricating coils," Wheeling officials continue. "Demand for coils will grow with adoption of automatic equipment in fabricators' plants."

No Scarcity—Customers can afford to be particular about how they receive their silicon steel. Although demand is firm for nonoriented grades, no one is "going hungry." Supply is tighter in grain-oriented steel, but most large users have firm commitments with suppliers and can fill their needs without difficulty.

Before and after the steel strike, producers were swamped with orders. Now, buying is becoming more conservative as users build up inventories. There's no pessimism among producers. All market analysts agree that the long term outlook is excellent. As sales officials at Wheeling explain: "Electrical sheet sales will follow growth in generating capacity, and that trend is steadily upward."

Plates . . .

Plate Prices, Page 183

Plate producers are swamped with demand. They are loaded with all the tonnage they can handle in first quarter and could easily fill second quarter schedules were they disposed to open books for that period. One producer of

alloy plate is taking April business.

Supply will be curtailed at the start of the new year when Bethlehem Steel Co. starts converting its 160-in. mill at Sparrows Point into a breakdown unit for tandem operations. A new 160-in. mill is to be completed about Mar. 1. The company's sheared plate output will be cut about 40 per cent for two months.

Steel Bars . . .

Bar Prices, Page 183

There's strong demand for hot-rolled carbon bars, particularly for large rounds and flats, and most producers are well booked up for January. It's fairly certain that business will be sufficient to support high level production schedules throughout the first quarter, despite the spotty demand reported at some points.

Some of the mills which have opened books for the entire first quarter already are booked through February. Others can still work in additional tonnage. All look for heavier automotive demand to fill schedules before too many weeks pass.

Demand for cold-finished bars is improving slowly. A turn for the better is noted in alloy bars.

Military steel requirements are expected to rise next quarter—especially those for alloy and stainless steels. It is reported the Defense department estimates alloy steel requirements for the period at 103,372 net tons, up 2 per cent from the first quarter mark this year. Stainless needs are placed at 12 per cent above those of a year ago.

Wire . . .

Wire Prices, Pages 185 & 186

Users of manufacturers wire have brought their inventories up to a workable level, and they have trimmed their ordering for December.

Last year auto makers' requirements were high at this time, but now they are delaying the placement of large orders, and the mills have open spaces on order books for December and January. Only a few products are "sold out" through January. Most of them can be ordered now for delivery next month.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 184 & 185

Automotive demand for cold-rolled sheets continues disappointing, but January allotments are being taken in full. Expectations are that tonnage needs will rise steadily in the new year as auto sales rise seasonally and manufacturing difficulties are overcome.

Requirements of the appliance makers are not as robust as the mills would like. On the brighter side: Steady demand for hot-rolled sheets is keeping the mills so busy there is little opportunity for them to roll light plate tonnage on their strip mills.

A Pittsburgh interest supplying strip to a producer of rims for auto wheels says its customer ordered 85 per cent of a normally heavy month's requirement of steel for December delivery, an increase of 35 per cent from the previous month. With rimmakers one month ahead of auto makers, this is interpreted as an indication that auto makers' demand for sheets will rise in January.

Inquiry for hot-rolled sheets in the East continues to be in excess of mill allotments.

Pressure for cold sheets is not strong. In some cases, notably among appliance makers, there is not the disposition to take all the tonnage alloted to them. Yet

Production line D-C welder?

Is there any other?

Is there any other welder that compares with the *exclusive* advantages offered by the Westinghouse RA d-c welder? Such outstanding advantages as . . .

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sellers say that so far they have been able to dispose of excess tonnage elsewhere. On the West Coast it is reported the international situation has created some "emotional" buying.

Business in galvanized sheets continues sluggish, reflecting seasonal influences and a lag in housing construction.

Automotive consumers continue to take their full quotas of cold-rolled sheets in the Chicago market, but they are not seeking over-quota tonnage for January or later first quarter months.

Tubular Goods . . .

Tubular Goods Prices, Page 187

The Suez canal crisis, attended by severe curtailment in shipments of Middle East oil to Europe and elsewhere, is stimulating sales of oil country tubular goods.

Pittsburgh area producers report that oil companies with interests abroad, particularly in South America, are increasing their orders for drill pipe and casing. They are taking all the tubing tonnage offered them, and are seeking to build up inventories in anticipation of increased requirements for oil in 1957.

Pipe sales are generally good. But producers expect the usual seasonal easing in demand for merchant pipe during the winter months. This reflects the usual slowing down in construction during midwinter.

Republic Steel Corp., Cleveland, announced revision of quantity extras on all types of pipe with the exception of oil country casing, tubing and drill pipe.

Import Steel Demand Is Off

Demand for imported steel is spotty. Inquiry for heavy plates and oil country pipe continues strong; reinforcing bars are moving well, and there is a slight pickup in barbed wire and nails. But demand for hot and cold-rolled sheets is mild. While channels are more active, business in beams is off. Merchant bars also are moving sluggishly.

Prices on western continental European steel are unchanged, except for a reduction of 10 cents per 100 lb on structural angles and a still sharper reduction in furring channels.

Deliveries from western continental Europe vary. Deformed bars are quoted for March and April shipment; bar angles for January; structural angles for February and March; I-beams for March and April; furring channels for January and February; and barbed wire for February.

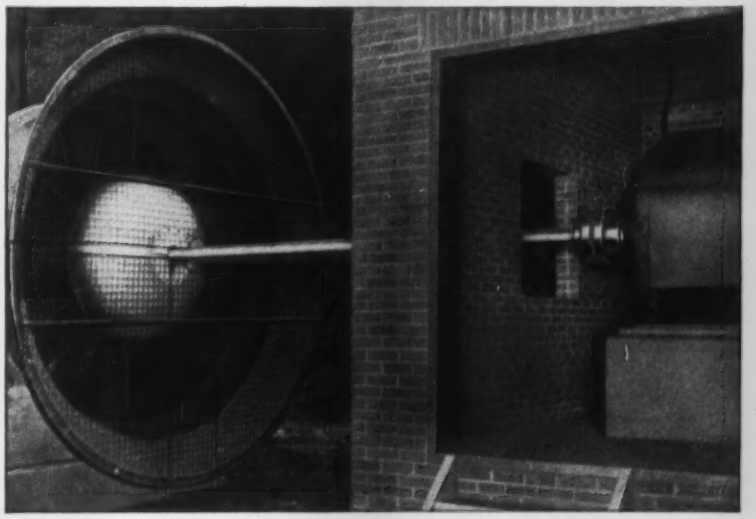
In plates, Thomas Steel quality can be had for delivery in two months and open hearth in five to six months. Hot-rolled sheets are being promised in two to three months and cold-rolled sheets in two months. Nails can be had in 40 to 60 days and merchant bars in two to three months. Wire rods are available in January for Thomas quality.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 183

Cold weather is beginning to restrict reinforcing bar demand, although some sellers say that the tightening money situation is having as much to do with the easing in demand as any one factor. But, there is still considerable business, with the diversion of various jobs

Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16' from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it, which have been giving dependable service for as long as fifteen years . . . without shutdowns for lubrication or maintenance of the couplings.

Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

Only Thomas Flexible Couplings offer *all* these advantages
UNDER LOAD and MISALIGNMENT

1. Freedom from Backlash—Torsional Rigidity
2. Free End Float
3. Smooth Continuous Drive with Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life

. . . *and*

THOMAS ALL METAL COUPLINGS HAVE NO WEARING PARTS SO LUBRICATION AND MAINTENANCE ARE ELIMINATED

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

from structural to reinforcing steel because of the shortage of shapes.

Warehouse . . .

Warehouse Prices, Page 188

Small fabricators of sheets, pipes, wire and several miscellaneous products are restricting purchases to prompt needs. They are attempting to reduce inventories before year end. There's little pressure for delivery of those items in December.

Users of cold-rolled sheets are getting ample supplies from the mills, since warehouses are experiencing no pressure from users of this item. By taking their full mill quotas of cold-rolled sheets, some warehouses are improving their inventory position.

Users of light and heavy plates and all structural shapes are attempting to accumulate stocks in anticipation of a possible reduction of mill quotas in the first quarter of next year. Distributors are unable to stock plates. As a result, buyers complain that delivery from warehouses is almost as delayed as delivery from mills.

Fasteners . . .

Standard Pressed Steel Co., Jenkintown, Pa., increased prices on self-locking nuts approximately 8 per cent.

Pig Iron . . .

Pig Iron Prices, Page 188

U.S. Steel Corp. has taken its No. 5 blast furnace at its Edgar Thomson Works, Braddock, Pa., out of production for partial relining.

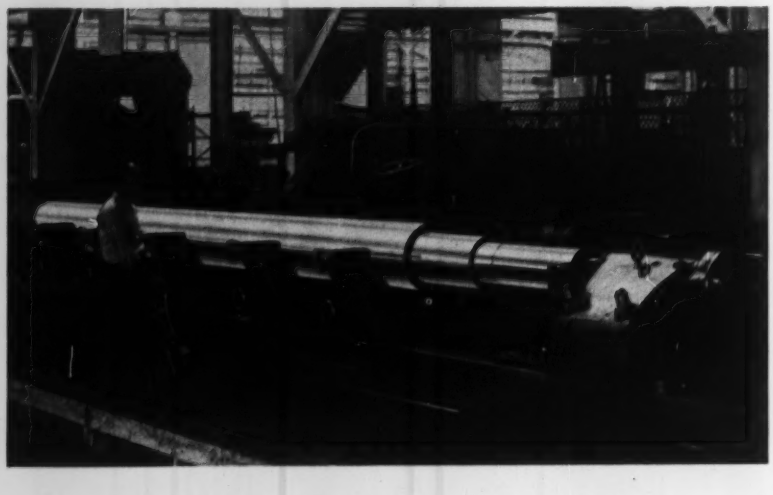
Plans to blow out the smaller of the two Alan Wood blast furnaces at Swedeland, Pa., on Jan. 1 have been postponed. (They will be rehabilitated and enlarged.) It appears that operations will not be suspended for another two or three months—assuming that the furnace can continue to operate with reasonable efficiency. But not too much of the iron made will be available to the merchant trade. There is a strong need to build up stocks at the furnace to meet anticipated requirement of the company. Some customers doubt that they will be able to get more than on occasional truck load.

Bethlehem Steel Co. is adhering to its plans to withdraw from the merchant trade permanently at the beginning of the year. While customers are interested in establishing other regular sources of supply, they are not quite so concerned as they were initially. They believe they can obtain iron at little, if any, increase in cost. At least that is true of most consumers in the Philadelphia area. Notable exceptions are buyers of low phos iron who probably will have to absorb freight from Troy, N. Y., instead of from Steelton, Pa.

All the Chicago district's blast furnaces are active.

The nation's blast furnaces produced a record 7,315,559 net tons of pig iron and ferroalloys during October, reports the American Iron & Steel Institute. This was 382,911 tons more than September output of 6,932,648 tons, and compares with 6,965,273 net tons produced in October a year ago.

STEEL MILL ROLLS
by
TITUSVILLE FORGE



ALL TYPES AND SIZES FORGED AND GROUND TO YOUR SPECIFICATIONS

Plate rolls—bending rolls—back up rolls—straightening rolls—table rollers and other mill rolls are dependably forged and ground in any size—to any specification at Titusville Forge. Illustrated above is a straightening roll being ground on our 42" Landis Grinder. Size is 16" diameter x 28'3⅛" long, 40/45 scleriscope hardness.

Rely on Titusville Forge for rolls that meet your specific requirements.

Struthers Wells

STRUTHERS WELLS CORPORATION
TITUSVILLE FORGE DIVISION
TITUSVILLE, PA.
PLANTS AT TITUSVILLE, PA., and WARREN, PA.
Offices in Principal Cities

The prior monthly record for blast furnace production was set in March, this year, when 7,149,443 net tons were produced.

Iron Ore . . .

Iron Ore Prices, Page 189

Shipments of iron ore on the Great Lakes in the week ended Nov. 26 totaled 1,747,932 gross tons, reports the Lake Superior Iron Ore Association. This compares with 1,559,040 tons in the like week a year ago.

Cumulative shipments in the 1956 navigation season to Nov. 26 are reported at 75,092,622 tons. This is 11,752,557 tons under the 86,845,179 tons moved up to Nov. 26 in the 1955 season.

Steel Barrel Shipments Off

Shipments of 2,725,076 steel shipping barrels in September were off about 11 per cent from the 3,068,441 reported for the preceding month, and were down 12 per cent from the 3,090,675 units shipped in September a year ago, reports the Census Bureau. The total for the first nine months was ahead of the corresponding period last year — 29,252,286 units, against 27,596,397.

Woodward Miners Signed

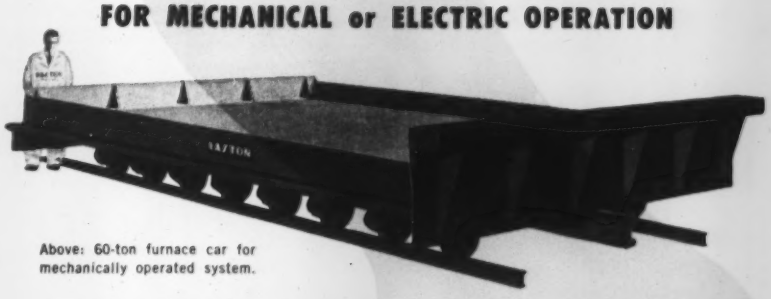
A three-year contract has been signed by local 13814, United Mine Workers of America and the Woodward Iron Co., Birmingham. Wage increases over the contract period amount to 45 cents an hour. Also provided: A $100 a month pension, exclusive of Social Security benefits, for employees 65 years or older with 20 years or more service, and a $100 a month disability pension for employees with ten years or more service, regardless of age at the time of disability.

A similar contract had been approved by local 12019, United Mineworkers, at the company's by-products plant. It has about 300 employees.

The 650 miners involved are represented by local 13814. They have not been on strike but have been idle since Oct. 31, along with 1900 other Woodward employees, because of a walkout of 700 blast furnace and transport workers in a dispute over incentive pay.

Furnace Cars

FOR MECHANICAL or ELECTRIC OPERATION



Above: 60-ton furnace car for mechanically operated system.

CUSTOM-BUILT and quality-built for dependable service. Easton experience includes all types of furnace and transfer cars for modern heat treating systems. Built to any desired capacity.

Write or telephone for technical information.

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You'll find Ruemelin Fume Collectors ideal for stopping noxious welding fumes *at their source*. Counter-balanced inlet hood stays in working area, automatically. Improves working conditions . . . lessens fatigue . . . paves the way for increased plant production. Thousands in everyday service. Write for Fume Collector Bulletin No. 37E.

•

(Left) "Illustrating the 15 ft. reach collector. Handles large or small work. Units available with 9 ft., 15 ft., 17 ft. and 20 ft. reach."

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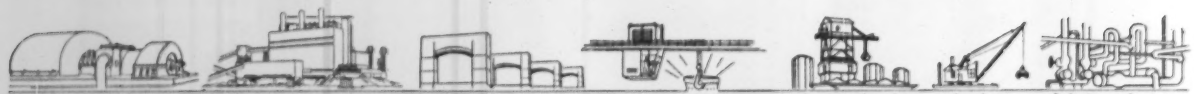
Why only ORE BRIDGES at McLouth's Trenton Mill?

At some steel plants the unloading, stocking and reclaiming of blast furnace materials are divided into separate operations. Two different machines, unloaders and bridges, work together economically to handle large tonnages.

This is not always the case. A plant that has only a few furnaces can realize substantial savings by building a dual-purpose machine to do the entire task. That's what McLouth did. At their Trenton, Michigan, mill these two modern Dravo bridges perform all functions —unloading, stocking and reclaiming ore and limestone.

Practical engineering assistance is available to help you solve problems or reduce costs in bulk materials handling or in any of the fields listed below. Write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION



Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping

foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

Structural Shapes . . .

Structural Shape Prices, Page 183

U.S. Steel Corp. is placing contracts for facilities that will add over 1,300,000 ingot tons to the capacity of its Chicago district plants. Plates and structurals will make up the bulk of the resulting 900,000 tons of steel products.

Tighter money and extended deliveries of structural steel are holding up some construction jobs. There is still considerable activity, and a number of important jobs have been closed the past week or so.

Phelps Dodge Corp. closed on 4640 tons for a tube mill in New Jersey. New York state thruway work in Westchester county will take 2050 tons.

Action is expected soon on two 30,000-ton office buildings to be erected in New York City. One will be in Rockefeller Center and the other at 33 W. 51st St. A number of schools in New York City are scheduled for placing over the next several months.

Of particular market significance was the placing of 500 tons for towers for the St. Lawrence river power project with the Societa' Anomina Elettrificazioni, Milan, Italy, on a bid of $173,734 to the New York State Power Authority. There were four bids on this job; the second lowest, amounting to $218,438, was submitted by the American Bridge Division, U.S. Steel Corp., Pittsburgh. The towers will be erected in the switchyards of the Barnhart Island power plant near Massena, N. Y.

Structural steel shipments against old orders are slightly heavier in New England.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4640 tons, tube mill in New Jersey, Phelps Dodge Corp., New York, to the Bethlehem Steel Co., Bethlehem, Pa.

2050 tons, New York state thruway work, Westchester county, through Mt. Vernon Construction Co. to the Ernst Iron Works, Buffalo.

1100 tons, foundation steel, Chase Manhattan Bank building, lower Manhattan, New York, to the Bethlehem Steel Co., Bethlehem, Pa., recently noted as having booked 47,300 tons for this project.

500 tons, towers for the St. Lawrence river project, awarded by the New York State Power Authority to Societa' Anomina Elettrificazioni, Milan, Italy, on a bid of $173,734. There were four bids in all, the second lowest being $218,438, submitted by the American Bridge Division, U. S. Steel Corp., Pittsburgh. The towers will be erected in the switch yards of the Barnhart Island power plant near Massena, N.Y.

500 tons, laboratory, Stevens Institute, Hoboken, N.J., through John J. McNamara, architect, to Schacht Steel Construction Inc., New York.

350 tons, state bridge, Montgomery county, Pa., to Mayer-Pollock Inc., Pottstown, Pa.

275 tons, section, state expressway, Bronx county, New York, through Conduit & Foundation, Philadelphia, to Ingalls Iron Works Co., Verona, Pa.

260 tons, three buildings, comprising office, laboratory and control building, American Brass Co., Terre Haute, Ind., to a Chicago fabricator.

250 tons, power plant, unit 5, Tallahassee, Fla., to O'Neal Steel Co., Birmingham; Rust Engineering Co., Birmingham, general contractor.

240 tons, state thruway bridge work, Nassau county, New York, through Tuckahoe Construction Co. and Builders Construction Co. acting jointly on the general contract, to the Pine Brook Iron Works, Scranton, Pa.

230 tons, boiler assembly building, E. Keeler Co., Williamsport, Pa., to the Milton Steel & Supply Co., Milton, Pa.

145 tons, stringer bridge, Worcester, Mass., to West End Iron Works, Cambridge; Frank Kirby Construction Co., Worcester, general contractor.

125 tons, state highway bridge, Williamstown, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Dingley Contracting Co., Natick, Mass., general contractor.

100 tons or more, academy building, Hamden, Conn., to New England Iron Works, New Haven; E. & F. Construction Co., Bridgeport, general contractor; reinforcing, Fox Steel Co., Orange, Conn.

STRUCTURAL STEEL PENDING

4100 tons, state thruway work, Niagara section, contract 56-9, Erie county, New York, bids Dec. 6.

3700 tons, state thruway work, Niagara section, contract 56-1, Erie county, New York, bids Dec. 6.

2750 tons, New York state thruway work over the Byram river, Westchester county, Poirer & McLane Corp., low on general contract.

940 tons, state bridge work, contract 56-5, Queens county, New York, bids Dec. 6.

500 tons, YMCA building, Portland, Oreg.; A. V. Peterson Co., Portland, low at $1,207,748 (above estimate).

130 tons, also 80 tons of reinforcing bars, Brewster Flat pumping station, Bridgeport, Wash., bids in to the Bureau of Reclamation.

Unstated, addition to the Idaho reactor facility; Paul Hardeman Inc., Los Angeles, is low at $1,580,000 to the Atomic Energy Commission.

REINFORCING BARS . . .

REINFORCING BARS PLACED

290 tons, Washington state highway girder bridge, Yakima county, to Northwest Steel Rolling Mills Inc., Seattle; Marshall Construction Co., Hermiston, Oreg., general contractor, is low at $324,943.

1160 tons, eight barracks, Ft. Lee, Virginia, to Virginia Steel Co., Richmond, Va.; Wise Contracting Co., Richmond, general contractor; 60 tons, structurals, Liphart Steel Co.

1900 tons, SAGA operations center, McChord Air Base, Washington state, to the Bethlehem Pacific Coast Steel Corp., Seattle; general contract awarded by Western Electric Co., prime contractor, to Howard S. Wright & Co. Inc. and Lease Co., Seattle.

980 tons, Ambassador Town House, Philadelphia, Carlisle Construction Co., that city, low on general contract.

600 tons, North Illinois toll route contract N-5A, including prestressed precast concrete bridge over the Fox river, Kan county, for Illinois State Toll Highway Commission, Chicago, bids Dec. 20.

525 tons, sewage treatment plant, Levittown, Pa., through the Luff Construction Co., Willow Grove, Pa., general contractor, to the U.S. Steel Products Division, U.S. Steel Corp., Trenton, N.J.

150 tons, power plant, unit 5, Tallahassee, Fla., to Cosco Products Co., Jacksonville, Fla.; Rust Engineering Co., Birmingham.

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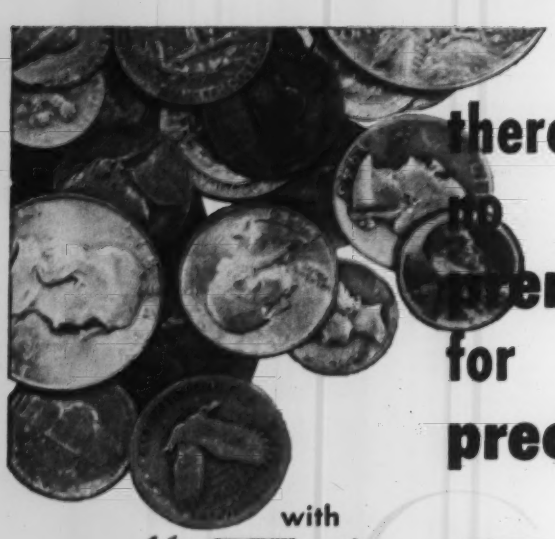

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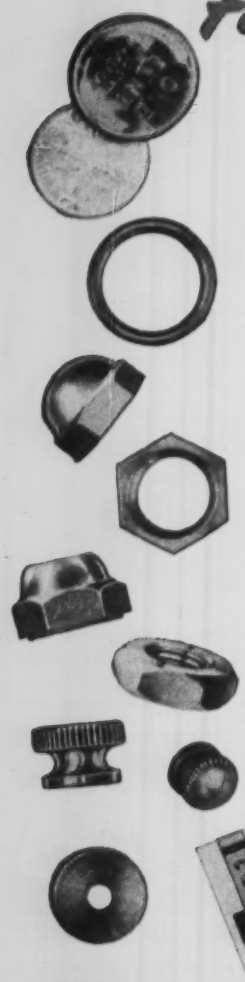
BRASS AND ALUMINUM NUTS



Costing no more than nuts produced by other, less accurate methods, Fischer precision-turned brass and aluminum nuts make possible important savings in assembly operations. Check these advantages:

Countersunk on both sides for faster starting . . .

Tapped square with face to Class 2 tolerances for smoother, easier running and superior bearing surfaces . . .

Turned from stock under basic size so they're never tight on wrenches . . .

Tapped through, eliminating "blanks" or rejects . . .

Cleaned and degreased before delivery to save you these operations.

Specify Fischer on your next order. A complete range of standard types and sizes is maintained in stock . . . "specials" can be produced quickly and inexpensively.

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TURNED NUTS Fischer SPECIAL MFG. CO. CINCINNATI OHIO SINCE 1908

C-284-FS

general contractor.

150 tons, Washington state highway bridges, Ft. Lewis, to James D. English Steel Co., Tacoma, Wash.; Woodworth & Co., Tacoma, is general contractor.

130 tons, laboratory, Curtiss-Wright Corp., Princeton, N.J., through L. C. Bowers, general contractor, to American Steel Engineering Co., Philadelphia.

110 tons, building, Kraft Foods, Philadelphia, to American Steel Engineering Co., Philadelphia.

100 tons, dormitory, College of Puget Sound, Tacoma, Wash., to James D. English Steel Co., Tacoma; Strom Construction Co., Tacoma, general contractor.

REINFORCING BARS PENDING

335 tons, North Illinois toll route contract N-4B, 5.45 miles between Harmony and Henpeck, Ill., for Illinois State Toll Highway Commission, Chicago, bids Dec. 20.

Unstated, 500,000-gal concrete water reservoir and pumping plant, Fairchild Air Base, Spokane, Wash.; bids to the U. S. Engineer, Seattle, Dec. 19.

PLATES . . .

PLATES PENDING

750 tons, pumping plant, storage, etc., Chief Joseph dam project, Bridgeport, Wash.; Ward Construction Co. and A. V. Phillips Co., Seattle, joint low at $847,585 to the Bureau of Reclamation.

200 tons, two fuel storage tanks, Paine Air Base, Everett, Wash.; Roy T. Earley, Tacoma, Wash., is low at $112,463 to the U.S. Engineer, Seattle.

100 tons plus, storage tank, Larson Air Base, Washington state; bids Dec. 20.

Unstated, gas storage tank, Idaho reactor facility; Arrington Construction Co., Idaho Falls, Idaho, low at $78,850 to the Atomic Energy Commission.

PIPE . . .

STEEL PIPE PLACED

310 tons, 72-in. boiler pipe for New York city, through Alco Products Inc., that city.

CAST IRON PIPE PENDING

200 tons, 3700 ft of 16-in., for Fairchild Air Base, Washington state; bids to U. S. Engineer, Seattle, Dec. 19.

100 tons plus, 45,680 ft of assorted sizes; bids to Irene Walters, clerk, Garden City, Idaho, Nov. 30; also accessories and alternatives.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Costa Rican government, fourteen 500-hp diesel-electric units, to the General Electric Co., Schenectady, N. Y.

LOCOMOTIVES PENDING

Chesapeake & Ohio, 30 diesel-electric units; purchase authorized by directors.

RAILROAD CARS PLACED

Santos-Jundiai Railroad of Sao Paulo, Brazil, 90 stainless steel passenger cars to the Budd Co., Philadelphia. Thirty-four of the cars will be assembled at the company's Red Lion plant, Philadelphia, and the remaining 56 in Sao Paul by Budd's licensee, Material Ferroviario.

Duluth, Missabe & Iron Range, 500 seventy-ton ore cars, to ACF Industries Inc., New York.

Western Maryland, 400 cars, 300 seventy-ton cars going to the Bethlehem Steel Co., Bethlehem, Pa., and 100 seventy-ton covered hoppers to the Greenville Steel Car Co., Greenville, Pa.

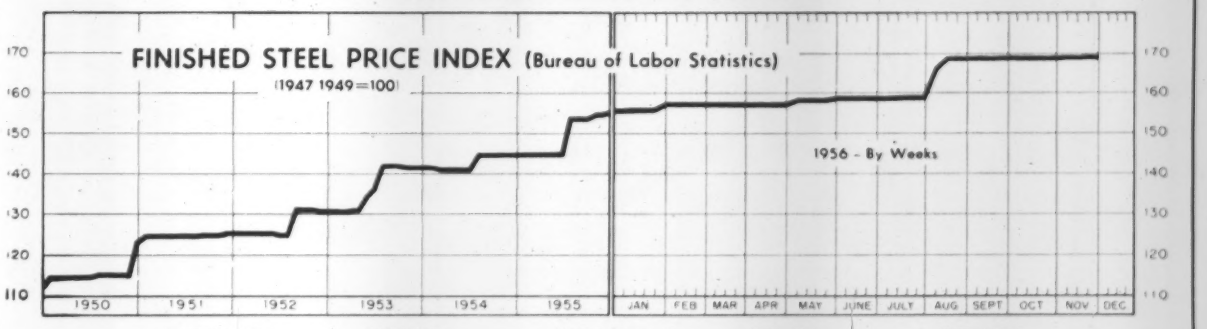
National of Mexico, 100 thirty-ton caboose cars to the Magor Car Corp., New York.

Canadian National, eight rail-diesel cars, to the Budd Co., Philadelphia.

RAILROAD CARS PENDING

Rail-Trailer Co., 200 seventy-five-foot flatcars; bids asked; equipment is for pooling service company provides to eight railroads participating in trailer train piggyback operations.

Price Indexes and Composites



Nov. 27, 1956	Week Ago	Month Ago	Nov. Avg.	Year Ago
168.8	168.8	168.6	168.8	154.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 27

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R., Alloy, High Speed, W, 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	45.033	Black Plate, Canmaking Quality	7.233
Tubing, Mechanical, Carbon (100 ft)	22.973	Wire, Drawn, Carbon	9.175
Tubing, Mechanical, Stainless, 304 (100 ft)	187.133	Wire, Drawn, Stainless, 430 (lb)	0.630
Tin Plate, Hot-dipped, 1.25 lb	9.433	Bale Ties (bundle)	7.213
Tin Plate, Electrolytic, 0.25 lb	8.133	Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 28 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.92	225.92	225.92	208.90	171.92
Index in cents per lb	6.111	6.111	6.111	5.659	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.66	$137.66	$137.66	$128.14	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	64.67	62.00	58.67	47.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 28 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.35	5.35	5.35	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.40	5.40	5.40	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Nov. 28 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld, Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, NevilleIsland,Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne.	235.00†	235.00†	235.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$66.50	$62.50	$57.50	$46.50	$44.00
No. 1 Heavy Melt, E. Pa.	62.50	59.00	57.50	48.00	42.50
No. 1 Heavy Melt, Chicago	65.00	64.50	61.00	46.50	42.50
No. 1 Heavy Melt, Valley	66.50	66.50	66.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	65.00	65.00	65.00	49.50	43.00
No. 1 Heavy Melt, Buffalo	59.50	59.50	57.50	43.50	43.00
Rails, Rerolling, Chicago	89.00	87.50	87.50	69.50	52.50
No. 1 Cast, Chicago	50.50	50.50	50.50	49.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

"If you had asked me that question three months ago..."

"—I would have been ashamed to answer you. But today, I'm glad to say, we have a good Payroll Savings Plan—with 84.4% of our employees enrolled.

"Of course, we've always had The Plan—put it in during the war—but with changes in personnel and our failure to present the Plan to new employees, participation dropped to almost nothing.

"One day our State Director of the Savings Bond Division, U. S. Treasury Department, dropped in to see me. When he told me how far below average we were I asked him what we could do to bring it up. He gave me a complete campaign built around a person-to-person canvass that would put a Payroll Savings Application Blank in the hands of every employee, with the Treasury furnishing pay-envelope stuffers, posters and other literature. I was a little dubious about the personal canvass but our employees were enthusiastic, in fact, officials of our union volunteered to undertake the canvass. There was no pressure, no teams, no prizes—just the distribution of the Application Blanks. Our employees did the rest—84.5% enrollment.

"84.5% is a good enrollment but we are not going to rest on it. A number of companies are in the 90% bracket—that's our goal."

Your State Director, Savings Bond Division, U. S. Treasury Department, will be glad to help you install The Payroll Savings Plan, or build participation in an existing plan. Write: Savings Bond Division, U.S. Treasury Department, Washington 25, D.C.

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STEEL
The Metalworking Weekly

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 184; to footnotes, page 186.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$70.50

INGOTS, Alloy (NT)

Detroit R7	$74.00
Houston S5	74.00
Midland,Pa. C18	74.00
Munhall,Pa. U5	74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$74.00
Bessemer,Pa. U5	74.00
Bridgeport,Conn. N19	79.00
Buffalo R2	74.00
Clairton,Pa. U5	74.00
Ensley,Ala T2	74.00
Fairfield,Ala. T2	74.00
Fontana,Calif. K1	83.50
Gary,Ind. U5	74.00
Johnstown,Pa. B2	74.00
Lackawanna,N.Y. B2	74.00
LoneStar,Tex. L6	80.00
Munhall,Pa. U5	74.00
Pittsburgh J5	74.00
S.Chicago,Ill. R2, U5	74.00
S.Duquesne,Pa. U5	74.00
Sterling,Ill. N15	74.00
Youngstown R2	74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	$91.50
Bessemer,Pa. U5	91.50
Bridgeport,Conn. N19	96.50
Buffalo R2	91.50
Canton,O. R2	94.00
Clairton,Pa. U5	91.50
Conshohocken,Pa. A3	96.50
Ensley,Ala. T2	91.50
Fairfield,Ala. T2	91.50
Fontana,Calif. K1	101.00
Gary,Ind. U5	91.50
Geneva,Utah C11	91.50
Houston S5	96.50
Johnstown,Pa. B2	91.50
Lackawanna,N.Y. B2	91.50
LosAngeles B3	101.00
Midland,Pa. C18	91.50
Munhall,Pa. U5	91.50
Pittsburgh J5	91.50
Seattle B3	105.00
S.Chicago R2, U5, W14	91.50
S.Duquesne,Pa. U5	91.50
S.SanFrancisco B3	101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$107.00
Bridgeport,Conn. N19	107.00
Buffalo R2	107.00
Canton,O. R2	107.00
Conshohocken,Pa. A3	114.00
Detroit R7	107.00
Fontana,Calif. K1	128.00
Gary,Ind. U5	107.00
Houston S5	112.00
Ind.Harbor,Ind. Y1	107.00
Johnstown,Pa. B2	107.00
Lackawanna,N.Y. B2	107.00
LosAngeles B3	127.00
Massillon,O. R2	107.00
Midland,Pa. C18	107.00
Munhall,Pa. U5	107.00
S.Chicago R2,U5,W14	107.00
S.Duquesne,Pa. U5	107.00
Struthers,O. Y1	107.00
Warren,O. C17	107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19	$116.50
Buffalo R2	111.50
Canton,O. R2	114.00
Cleveland R2	111.50
Gary,Ind. U5	111.50
S.Chicago,Ill. R2,W14	111.50
S.Duquesne,Pa. U5	111.50

SKELP

Aliquippa,Pa. J5	4.725
LoneStar,Tex. L6	5.025
Munhall,Pa. U5	4.625
SparrowsPoint,Md. B2	4.625
Warren,O. R2	4.625
Youngstown R2, U5	4.625

WIRE RODS

AlabamaCity,Ala. R2	5.80
Aliquippa,Pa. J5	5.00
Alton,Ill. L1	6.00
Buffao W12	5.80
Cleveland A7	5.80
Donora,Pa. A7	5.80
Fairfield,Ala. T2	5.80
Houston S5	6.05
IndianaHarbor,Ind. Y1	5.80
Johnstown,Pa. B2	5.80
Joliet,Ill. A7	5.80
KansasCity,Mo. S5	6.05
Kokomo,Ind. C16	5.90
LosAngeles B3	6.60
Minnequa,Colo. C10	6.05
Monessen,Pa. P7	5.80
N.Tonawanda,N.Y. B11	5.80
Pittsburg,Calif. C11	6.45
Portsmouth,O. P12	5.80
Roebling,N.J. R5	5.90
S.Chicago,Ill. R2	5.80
SparrowsPoint,Md. B2	5.90
Sterling,Ill.(1) N15	5.80
Sterling,Ill. N15	5.90
Struthers,O. Y1	5.80
Worcester,Mass. A7	6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	5.00
Aliquippa,Pa. J5	5.00
Bessemer,Ala. T2	5.00
Bethlehem,Pa. B2	5.05
Birmingham C15	5.30
Clairton,Pa. U5	5.00
Fairfield,Ala. T2	5.00
Fontana,Calif. K1	5.70
Gary,Ind. U5	5.00
Geneva,Utah C11	5.00
Houston S5	5.10
Ind.Harbor,Ind. I-2	5.00
Johnstown,Pa. B2	5.05
KansasCity,Mo. S5	5.10
Lackawanna,N.Y. B2	5.05
LosAngeles B3	5.70
Minnequa,Colo. C10	5.30
Munhall,Pa. U5	5.00
Niles,Calif. P1	5.75
Phoenixville,Pa. P4	5.85
Portland,Oreg. O4	5.80
Seattle B3	5.75
S.Chicago,Ill. U5, W14	5.00
S.SanFrancisco B3	5.65
Sterling,Ill. N15	5.00
Torrance,Calif. C11	5.70
Weirton,W.Va. W6	5.00

Wide Flange

Bethlehem,Pa. B2	5.05
Clairton,Pa. U5	5.00
Fontana,Calif. K1	5.85
IndianaHarbor,Ind. I-2	5.00
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
Phoenixville,Pa. P4	5.85
S.Chicago,Ill. U5	5.00

Alloy Std. Shapes

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
Houston S5	6.30
Munhall,Pa. U5	6.20
S.Chicago,Ill. U5	6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	7.35
Bessemer,Ala. T2	7.35
Bethlehem,Pa. B2	7.40
Clairton,Pa. U5	7.35
Fairfield,Ala. T2	7.35
Fontana,Calif. K1	8.05
Gary,Ind. U5	7.35
Geneva,Utah C11	7.35
Houston S5	7.45
Ind.Harbor,Ind. I-2, Y1	7.35
Johnstown,Pa. B2	7.40
KansasCity,Mo. S5	7.45
Lackawanna,N.Y. B2	7.40
LosAngeles B3	8.05
Munhall,Pa. U5	7.35
Seattle B3	8.10
S.Chicago,Ill. U5, W14	7.35
S.SanFrancisco B3	8.00
Struthers,O. Y1	7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	7.40
Ind.Harbor,Ind. I-2	7.35
Lackawanna,N.Y. B2	7.40
Munhall,Pa. U5	7.35
S.Chicago,Ill. U5	7.35

PILING

BEARING PILES

Bethlehem,Pa. B2	5.05
Lackawanna,N.Y. B2	5.05
Munhall,Pa. U5	5.00
S.Chicago,Ill. U5	5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.90
Lackawanna,N.Y. B2	5.90
Munhall,Pa. U5	5.90
S.Chicago,Ill. U5	5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Ashland,Ky. (15) A10	4.85
Bessemer,Ala. T2	4.85
Bridgeport,Conn. N19	4.75
Clairton,Pa. U5	4.85
Claymont,Del. C22	5.35
Cleveland J5, R2	4.95
Coatesville,Pa. L7	5.25
Conshohocken,Pa. A3	4.90
Detroit M1	4.95
Ecorse,Mich. G5	4.95
Fairfield,Ala. T2	4.85
Fontana,Calif.(30) K1	5.55
Gary,Ind. U5	4.85
Geneva,Utah C11	4.85
GraniteCity,Ill. G4	5.05
Harrisburg,Pa. P4	5.80
Houston S5	4.95
Ind.Harbor,Ind. I-2, Y1	4.85
Johnstown,Pa. B2	4.85
Lackawanna,N.Y. B2	4.85
LoneStar,Tex. L6	5.20
Minnequa,Colo. C10	5.70
Munhall,Pa. U5	4.85
Newport,Ky. N9	4.85
Pittsburgh J5	4.85
Riverdale,Ill. A1	4.85
Seattle B3	5.75
Sharon,Pa. S3	4.85
S.Chicago,Ill. U5, W14	4.85
SparrowsPoint,Md. B2	4.85
Steubenville,O. W10	4.85
Warren,O. R2	4.85
Weirton,W.Va. W6	4.85
Youngstown R2, U5, Y1	4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	6.20
Fontana,Calif. K1	6.70
Geneva,Utah C11	6.00
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	7.25
Bessemer,Ala. T2	7.25
Clairton,Pa. U5	7.25
Claymont,Del. C22	7.55
Cleveland J5, R2	7.25
Coatesville,Pa. L7	7.55
Conshohocken,Pa. A3	7.25
Ecorse,Mich. G5	7.35
Fairfield,Ala. T2	7.25
Fontana,Calif.(30) K1	7.95
Gary,Ind. U5	7.25
Geneva,Utah C11	7.25
Houston S5	7.35
Ind.Harbor,Ind. I-2, Y1	7.25
Johnstown,Pa. B2	7.25
Munhall,Pa. U5	7.25
Pittsburgh J5	7.25
Seattle B3	8.15
Sharon,Pa. S3	7.25
S.Chicago, Ill. U5, W14	7.25
SparrowsPoint,Md. B2	7.25
Warren,O. R2	7.25
Youngstown U5, Y1	7.25

PLATES Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.85
Coatesville,Pa. L7	6.85
Fontana,Calif.(30) K1	7.55
Gary,Ind. U5	6.85
Houston S5	6.95
Ind.Harbor,Ind. Y1	6.85
Johnstown,Pa. B2	6.85
Munhall,Pa. U5	6.85
Newport,Ky. N9	6.85
Seattle B3	7.75
Sharon,Pa. S3	6.85
S.Chicago,Ill. U5, W14	6.85
SparrowsPoint,Md. B2	6.85
Youngstown Y1	6.85

FLOOR PLATES

Cleveland J5	5.925
Conshohocken,Pa. A3	5.925
Harrisburg,Pa. P4	6.275
Ind.Harbor,Ind. I-2	5.925
Munhall,Pa. U5	5.925
S.Chicago,Ill. U5	5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10	5.10
Ashland l.c.l. (15) A10	5.60
Cleveland c.l. R2	5.60
Warren,O. c.l. R2	5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2	5.075
Aliquippa,Pa.(9) J5	5.075
Alton,Ill. L1	5.275
Atlanta(9) A11	5.575
Bessemer,Ala.(9) T2	5.075
Birmingham(9) C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo(9) R2	5.075
Clairton,Pa. U5	5.075
Cleveland(9) R2	5.075
Ecorse,Mich.(9) G5	5.175
Emeryville,Calif. J7	5.85
Fairfield,Ala.(9) T2	5.075
Fairless,Pa.(9) U5	5.225
Fontana,Calif.(9) K1	5.775
Gary,Ind.(9) U5	5.075
Geneva,Utah(9) C11	5.157
Houston(9) S5	5.325
Ind.Harbor(9) I-2, Y1	5.075
Johnstown,Pa.(9) B2	5.075
Joliet,Ill. P22	5.575
KansasCity,Mo.(9) S5	5.325
Lackawanna(9) B2	5.075
LosAngeles(9) B3	5.775
Milton,Pa.(23) M18	5.425
Minnequa,Colo. C10	5.525
Niles,Calif. P1	5.85
N.T'wanda,N.Y.(9) B11	5.075
Pittsburg,Calif.(9) C11	5.775
Pittsburgh(9) J5	5.075
Portland,Oreg. O4	5.85
Seattle B3, N14	5.825
S.Ch'c'go(9) R2,U5,W14	5.075
S.Duquesne,Pa.(9) U5	5.075
S.SanFran.,Calif.(9) B3	5.825
Sterling,Ill.(1) N15	5.075
Sterling,Ill. N15	5.175
Struthers,O. Y1	5.075
Torrance,Calif.(9) C11	5.775
Weirton,W.Va.(9) W6	5.075
Youngstown(9) R2, U5	5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17	7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	6.125
Bridgeport,Conn. N19	6.20
Buffalo R2	6.125
Canton,O. R2	6.125
Clairton,Pa. U5	6.125
Detroit R7	6.125
Ecorse,Mich. G5	6.225
Fairless,Pa. U5	6.275
Fontana,Calif. K1	7.175
Gary,Ind. U5	6.125
Houston S5	6.375
Ind.Harbor,Ind. I-2,Y1	6.125
Johnstown,Pa. B2	6.125
KansasCity,Mo. S5	6.375
Lackawanna,N.Y. B2	6.125
LosAngeles B3	7.175
Massillon,O. R2	6.125
Midland,Pa. C18	6.125
S.Chicago R2, U5, W14	6.125
S.Duquesne,Pa. U5	6.125
Struthers,O. Y1	6.125
Warren,O. C17	6.125
Youngstown U5	6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	7.425
Bessemer,Ala. T2	7.425
Bethlehem,Pa. B2	7.425
Bridgeport,Conn. N19	7.50
Clairton,Pa. U5	7.425
Cleveland R2	7.425
Ecorse,Mich. G5	7.525
Fairfield,Ala. T2	7.425
Fontana,Calif. K1	8.125
Gary,Ind. U5	7.425
Houston S5	7.675
Ind.Harbor,Ind. Y1	7.425
Johnstown,Pa. B2	7.425
KansasCity,Mo. S5	7.675
Lackawanna,N.Y. B2	7.425
LosAngeles B3	8.125
Pittsburgh J5	7.425
Seattle B3	8.175
S.Chicago,Ill. U5 W14	7.425
S.DuquesnePa. U5	7.425
S.SanFrancisco B3	8.175
Struthers,O. Y1	7.425
Youngstown U5	7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2	6.225
Houston S5	6.325
KansasCity,Mo. S5	6.325
Lackawanna(9) B2	6.075
Sterling,Ill. N15	6.175
Sterling,Ill.(1) N15	6.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	5.075
Atlanta A11	5.575
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.85
Pittsburgh J5	5.075
Portland,Oreg. O4	5.85
SanFrancisco S7	5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	6.20
Gary,Ind. U5	6.20
Houston S5	6.45
KansasCity,Mo. S5	6.45
Cleveland C20	9.475
LosAngeles S30	11.10
LosAngeles P2	11.00
Monaca,Pa. S17	9.225
Newark,N.J. W18	9.65
Warren,O. C17	9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	6.85
BeaverFalls,Pa. M12,R2	6.85
Bridgeport,Conn. N19	7.20
Buffalo B5	6.90
Camden,N.J. P13	7.30
Carnegie,Pa. C12	6.85
Chicago W18	6.85
Cleveland A7, C20	6.85
Detroit B5, P17	7.05
Detroit R7	6.85
Donora,Pa. A7	6.85
Elyria,O. W8	6.85
FranklinPrk,Ill. N5	6.85
Gary,Ind. U5	6.85
GreenBay,Wis. F7	6.85
Hammond,Ind. L2, M13	6.85
Hartford,Conn. R2	7.30
Harvey,Ill. B5	6.85
LosAngeles(49) S30	8.30
LosAngeles P2, R2	8.30
Mansfield,Mass. B5	7.40
Massillon,O. R2, R8	6.85
Midland,Pa. C18	6.85
Monaca,Pa. S17	6.85
Newark,N.J. W18	7.30
NewCastle,Pa.(17) B4	6.85
Pittsburgh J5	6.85
Plymouth,Mich. P5	7.10
Putnam,Conn. W18	7.40
Readville,Mass. C14	7.40
S.Chicago,Ill. W14	6.85
SpringCity,Pa. K3	7.30
Struthers,O. Y1	6.85
Waukegan,Ill. A7	6.85
Youngstown F3, Y1	6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	8.325
BeaverFalls,Pa. M12,R2	8.325
Bethlehem,Pa. B2	8.325
Bridgeport,Conn. N19	8.475
Buffalo B5	8.325
Camden,N.J. P13	8.50
Canton,O. T7	7.425
Carnegie,Pa. C12	8.325
Chicago W18	8.325
Cleveland A7, C20	8.325
Detroit B5, P17	8.325
Detroit R7	8.325
Donora,Pa. A7	8.325
Elyria,O. W8	8.325
FranklinPark,Ill. N5	8.325
Gary,Ind. R2	8.325
GreenBay,Wis. F7	8.325
Hammond,Ind. L2, M13	8.325
Hartford,Conn. R2	8.625
Harvey,Ill. B5	8.325
Lackawanna,N.Y. B2	8.325
LosAngeles P2, S30	10.10
Mansfield,Mass. B5	8.625
Massillon,O. R2, R8	8.325
Midand,Pa. C18	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
Plymouth,Mich. P5	8.525
S.Chicago W14	8.325
SpringCity,Pa. K3	8.50
Struthers,O. Y1	8.325
Warren,O. C17	8.325
Waukegan,Ill. A7	8.325
Worcester,Mass. A7	8.625
Youngstown F3, Y1	8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	5.075
Atlanta A11	5.575
Birmingham C15	5.375
Bridgeport,Conn. N19	5.30
Buffalo R2	5.075
Cleveland R2	5.075
Ecorse,Mich. G5	5.425
Emeryville,Calif. J7	5.85
Fairfield,Ala. T2	5.075
Fairless,Pa. U5	5.225

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 ....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ...4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago, Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 ....5.75
Conshohocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Dravosburg,Pa. U5 ....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. P4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ..6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 .5.75
Steubenville, O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Wierton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	..6.65	7.15
Dravosburg U5	..6.65	6.90
Fairfield T2	....6.65	6.90
Gary,Ind. U5	..6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	..6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	
Pittsburgh J5	.....6.65	
Pitts.,Calif. C11	..7.40	...
SparrowsPt. B2	..6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg,Pa. U5 ....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ...6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ..7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Cleveland R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. P4 ..8.35
Ind.Harbor,Ind. I-2 ....8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Ft.Worth,Tex.(42) T4 ..5.525
Gary,Ind. U5 ..... 5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.55
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.55
SandSprings,Okla. S5..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2..5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance, Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Marion,O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 .....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 ....5.60
Franklin,Pa.(3) F5 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O. (3) P11 ....5.15
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 .....6.15
Williamsport,Pa.(3) S19..5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt)L5 .19.50

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C6 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&.W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div. U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co., Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.675
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.675
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill. (1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.70	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	....	....	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	....	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
New York W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	....	....
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*†	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed coils only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Dravosburg,Pa. U5	8.40	8.65	9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	....	....
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Ind.Harbor Y1	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N8	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.65
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES, Stock

	Col.
AlabamaCity, Ala. R2	.164
Aliquippa,Pa. (7) J5	.167
Atlanta A11	.166
Bartonville,Ill (7) K4	.169
Crawfordsville,Ind.(7) M8	169
Donora,Pa. A7	.164
Duluth A7	.164
Fairfield,Ala. T2	.164
Houston,Tex. S5	.169
Jack'ville,Fla.(7)(20) M8	178
Johnstown,Pa. B2	.164
Joliet,Ill. A7	.164
Kansas City,Mo. S5	.169
Kokomo,Ind. C16	.166
Minnequa,Colo. C10	.169
Monessen,Pa. (7) P7	.167
Pittsburg,Calif. C11	.183
Rankin,Pa. A7	.164
S.Chicago,Ill. R2	.164
SparrowsPt.,Md. B2	.166
Sterling,Ill. (1) N15	.164
Worcester,Mass. A7	.170

NAILS, Stock

	Col.
Chicago (7) W13	.167
Cleveland (7) A9	.173

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg) To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth A7	9.53
Houston S5	9.78
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. S5	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth A7	9.85
Houston S5	10.10
Kokomo,Ind. C16	9.95
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. S5	10.10
Kokomo,Ind. C16	10.45
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.65
SparrowsPt.,Md. B2	9.95
Sterling,Ill.(1) N15	9.85

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth A7	9.90
Houston S5	10.15
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. S5	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(1) N15	9.90

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.184**
Aliquippa,Pa. J5	.184§
Atlanta A11	.190*
Bartonville,Ill. K4	.193
Crawfordsville,Ind. M8	.193
Donora,Pa. A7	.184†
Duluth A7	.184†
Fairfield,Ala. T2	.184†
Houston,Tex. S5	.189**
Jacksonville,Fla. M8	.198
Johnstown,Pa. B2	.188*
KansasCity,Mo. S5	.184†
Kokomo,Ind. C16	.189**
Minnequa,Colo. C10	.186†
Monessen,Pa. P7	.189**
Pittsburg,Calif. C11	.191*
Rankin,Pa. A7	.204†
S.Chicago,Ill. R2	.184†
S.SanFrancisco C10	.184**
SparrowsPoint,Md. B2	.207**
Sterling,Ill(1) N15	190*
	.188*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	.176**
Alig'ppa,Pa. 9-14½ga. J5	184§
Atlanta A11	.182*
Bartonville,Ill. K4	.187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	.176†
Duluth A7	.176†
Fairfield,Ala. T2	.176†
Houston,Tex. S5	.181**
Jacksonville,Fla. M8	.192
Johnstown,Pa.(43) B2	.180*
Joliet,Ill. A7	.176†
KansasCity,Mo. S5	.181**
Kokomo,Ind. C16	.178†
Minnequa,Colo. C10	.181**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	.199†
Rankin,Pa. A7	.176†
S.Chicago,Ill. R2	.176**
Sterling,Ill.(1) N15	.180*

WIRE (16 gage)

	An'id Galv. Stone	Galv. Stone
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	16.10	18.05
Buffalo W12	16.10	
Cleveland A7	15.70	17.25†
Crawf'sville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Houston S5	15.95	17.50**
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kan.City,Mo.S5	15.95	17.50**
Kokomo C16	15.80	17.35†
Minnequa C10	16.45	18.15**
P'lm'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	

WIRE, Merchant Quality (6 to 8 gage)

	An'id Galv.	
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	8.10	8.625§
Atlanta A11	8.05	8.65*
Bartonville(48) K4	8.20	8.80
Buffalo W12	8.10	8.50†
Cleveland A7	7.95	
Crawfordsville M8	8.20	8.80
Donora,Pa. A7	7.95	8.35†
Duluth A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) S5	8.20	8.60**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) S5	8.20	8.60**
Kokomo C16	8.05	8.45†
LosAngeles B3	8.90	9.50*
Minnequa, C10	8.20	8.60**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	8.90	9.30†
Portsmouth,O. P12	8.10	
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	8.90	9.30**
Spar'waPt. B2(48)	8.05	8.65*
Sterling(1)(48)N15	7.95	8.55*
Struth'rs,O.(48)Y1	7.95	8.45‡
Worcester,Mass.A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

TIE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	.190
Atlanta A11	.192
Bartonville,Ill. K4	.197
Crawfordsville,Ind. M8	.197
Donora,Pa. A7	.190
Duluth A7	.190
Fairfield,Ala. T2	.190
Houston S5	.195
Jacksonville,Fla. M8	.202
Joliet,Ill. A7	.190
KansasCity,Mo. S5	.195
Kokomo,Ind. C16	.192
Minnequa,Colo.C10	.195
Pitts.,Calif. C11	.214
S.Chicago,Ill. R2	.190
S.SanFrancisco C10	.214
SparrowsPoint.,Md. B2	.192
Sterling,Ill. N15	.190
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	.167
Franklin,Pa. F5	.167
Huntington,W. Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.167
Minnequa,Colo. C10	.172
S.Chicago,Ill. R2	.167
Sterling,Ill. N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FASTENERS

(Based discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:

6 in. and shorter . . 55

Longer than 6 in. . . 46.5

⅞ in. thru 1 in.:

6 in. and shorter . . 46.5

Longer than 6 in. . . 44

1⅛ in. and larger:

All lengths 44

Undersized Body (rolled thread)

½ in. and smaller:

6 in. and shorter . . 55

Carriage, Machine, Lag Bolts Hot Galvanized:

½ in. and smaller:

6 in. and shorter . . 35

Longer than 6 in. . . 23

⅞ in. thru 1 in.:

6 in. and shorter . . 20

Longer than 6 in. . . 20

1⅛ in. and larger:

All lengths 20

Lag Bolts

All diameters:

6 in. and shorter 55

Longer than 6 in. . . 47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter 54

Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:

All sizes 59

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅝ in. and smaller . 63

⅞ in. to 1 in. incl. 59.5

1⅛ in. to 1½ in., incl. 64

1⅝ in. and larger . 58

Hex Nuts, Reg. & Heavy, Cold Punched:

⅝ in. and smaller. . 63

⅞ in. to 1½ in., incl. 59.5

1⅝ in. and larger . 58

Hex Nuts, All Types, Hot Galvanized:

⅝ in. and smaller. . 50

⅞ in. to 1 in., incl. 46

1⅛ in. to 1½ in., incl. 51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅝ in. and smaller. . 63

⅞ in. to 1½ in., incl. 59.5

1⅝ in. and larger . 58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller . . 65

1⅛ in. to 1½ in., incl. 62

1⅝ in. and larger. . 58

CAP AND SET SCREWS

(Based discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread

Bright:

6 in. and shorter:

⅝ in. and smaller. . 47

⅞, 1 in. and 1 in. diam. 31

Longer than 6 in.:

⅝ in. and smaller. . 18.5

⅞, 1 in. and 1 in. diam. 5.5

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller. . 34

⅞, 1 in. and 1 in. diam. 13

Longer than 6 in.:

⅝ in. and smaller. +1

⅞, 1 in. and 1 in. diam. . . . . +19

Fillister Head, Coarse Thread:

Listed Sizes . . . . . +31

Flat Head, Coarse Head:

¼ in. and smaller by 6 in. and shorter. . +57

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter . . 11

Longer that 6 in. . . +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85

⅞-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. in.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	12	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
3	12	50.86	59.57	48.44
	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W. Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	....(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	....(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Dadd. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill sons, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.135 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.90c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.055"; 0.055" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; dadd. in mill sons or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 5.85c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.50	46.75	48.25	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	58.50	57.50	60.50	64.25	73.50	73.50
310	42.25	53.75	69.00	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	63.75	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.40	40.65

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7875
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity, Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
NewYork, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland, Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
‡Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon: add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls,N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09[9]	15.69	8.57	8.12	10.81
Birmingham	7.68‖	8.88‖	8.85‖	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.75	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.65	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.54	9.09	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	8.29	9.49	10.31	....	8.39	8.52	...	9.21	....	8.75	8.71	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	10.45	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	10.50	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; ‖2 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [9]—400 to 999 lb; [8]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅜-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00-34.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$28.50-29.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	24.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	55.10-58.40†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.50
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	29.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearney, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.40	$7.40	$7.40	$7.65
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	*7.40*	*7.40*	*7.40*	*7.70*
I-Beams	7.75	7.75	7.75	8.15
Plates	9.50	9.50	9.50	10.00
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*27.02*	*27.02*	*27.02*	*27.49*
Barbed Wire (†)	6.61	6.61	6.61	6.96
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	7.90	7.90	7.90	8.02

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si, $99.50; 16-19% Mn, $97.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 33.75c per lb of contained Mn, carload packed 35.05c, ton lots 36.55c, less ton 37.75c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24.15c per lb of contained Mn, packed, carload 25.45c, ton lot 27.05c, less ton 28.25c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.95c per lb of alloy. Packed, c.l. 14.15c, ton 14.60c, less ton 15.6c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lots $1.31, less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si. Packed c.l. 16c, ton lot 17.45c, less ton 19.1c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07% max Ca), C.l. lump, bulk 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13.9c per lb of briquet, c.l. packed pallets 14.1c, bags 15.1c; 3000 lb to c.l., pallets 15.3c; 2000 lb to c.l. bags, 16.3c, less ton 17.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 14.4c per lb of briquet, c.l. packed, pallets, 14.6c; bags 15.6c, 3000 lb to c.l., pallets, 15.8c; 2000 lb to c.l., bags 16.8c; less ton 17.7c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.55c per lb of briquet, packed, pallets, 7.75c; bags 8.75c; 3000 lb to c.l., pallets 9.35c; 2000 lb to c.l. bags 10.35c; less ton 11.25c. Delivered. Spot, add 0.25c. (Small size—weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.7c. Packed, pallets 7.9c; bags 8.9c; 3000 lb to c.l. pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.15 per lb of contained W; 2000 lb W to 5000 lb W, $3.25; less than 2000 lb W, $3.37. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.50% max). Ton lots 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lots $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lots 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lots 20.15c; less ton lots 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lots 19.55c; less ton lots 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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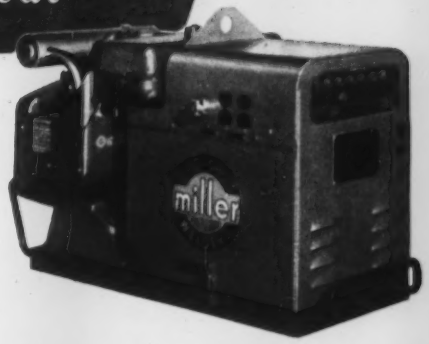

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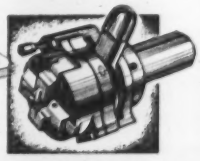

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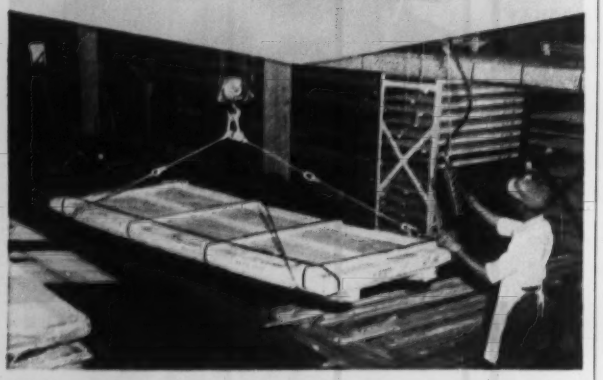

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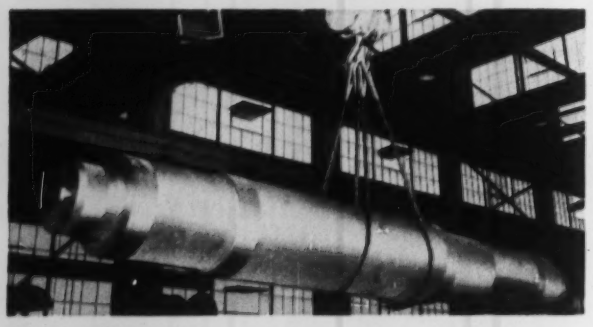

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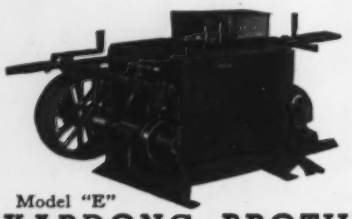

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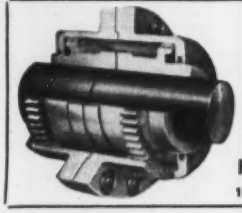

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Scrap Prices Soar at Pittsburgh

Substantial mill purchase of steelmaking grades reported at $9 a ton above the last representative district buy. General market trend continues upward at other points

Scrap Prices, Page 194

Pittsburgh—The first major mill purchase in a month confirmed brokers' views that the market has continued to gain strength. U.S. Steel Corp. bought scrap for its mills in the Monongahela valley on Nov. 27, paying $67 for No. 1 heavy melting, $59 for No. 2 heavy melting and $54 for No. 2 bundles. The $67 price on No. 1 steel represented a $9 a ton increase from the last important mill purchase. However, brokers' appraisals of the market recently quoted No. 1 heavy melting around $63.

Philadelphia—Prices no the major grades of open-hearth scrap have advanced sharply on the basis of substantial buying by the Fairless Works, U.S. Steel. It paid $63, delivered, for No. 1 heavy melting, No. 1 bundles and No. 1 busheling—$5 over its previous prices—and $54 for No. 2 bundles—up $7. It paid $56 for No. 2 heavy melting, a grade not included in its last purchase.

The price Fairless paid for the No. 1 grades represented a $3 advance over the current market; on No. 2 heavy melting, $6; and on No. 2 bundles, $5.

Cleveland—In the absence of new buying, the market here and in the Valley is holding at price levels established a couple of weeks ago. But closing of the automotive lists at month's end is expected to result in higher prices.

New York—Brokers have substantially boosted buying prices on the open-hearth grades. They offer $53-$54 for No. 1 heavy melting and No. 1 bundles; $47-$47.50 for No. 2 heavy melting; and $45-$46 for No. 2 bundles.

They are offering $1 higher on machine shop turnings and mixed borings and turnings, bringing their prices up to $33-$34. They have made a similar increase on short shoveling turnings, now paying $39-$40.

The cast iron grades are unchanged. Stainless scrap prices have been boosted on the 18-8 borings and turnings to $315-$340.

Boston—Major heavy melting steel grades are higher on the basis of new buying for eastern Pennsylvania delivery. No. 2 heavy melting and bundles are up.

Chicago—This area is awaiting consumer purchases for a true price yardstick. Some observers think a purchase is imminent—possibly No. 2 bundles. The price is expected to be around $48, or $6 above the last acquisition by the same consumer a month ago.

A few grades have inched up $1 to $2 on the basis of broker buying to fill outstanding contracts.

Detroit—Buying prices of scrap dealers and brokers are unchanged, but the feeling prevails they may slip 50 cents to $1 this month.

The Canadian water rate went off Dec. 1. As a result, it will cost $3 to $4 a ton more to ship scrap into Canada. Canadian buyers have taken heavy tonnage in recent weeks.

Buffalo—The local market continues quiet. Most new demand is from out of the district, notably Pittsburgh and Youngstown. The market undertone remains firm. Dealers' supplies are light.

Cincinnati—The undertone of the market is strong, though no new sales have been made to confirm quoted prices. No. 1 heavy melting is quoted at $59-$60, the highest on record. Closing of industrial lists is expected to point to higher prices for most key grades

Birmingham—The market is steady on moderate purchases. An Atlanta mill bought No. 2 heavy melting at $50, delivered. Brokers are offering No. 1 steel at $65 for northern shipment. Electric furnace and cast grades are firm. Consumers are filling their needs from local sources. Some specialty

(*Please turn to page* 199)

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Iron and Steel Scrap

Consumer prices, per gross tons, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 28	$64.67
Nov. 21	62.00
Oct. Avg.	57.27
Nov. 1955	46.08
Nov. 1951	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*66.00-67.00*
No. 2 heavy melting	*58.00-59.00*
No. 1 bundles	*66.00-67.00*
No. 2 bundles	*53.00-54.00*
No. 1 busheling	*66.00-67.00*
Machine shop turnings	*44.00-45.00*
Mixed borings, turnings	*44.00-45.00*
Short shovel turnings	*48.00-49.00*
Cast iron borings	*48.00-49.00*
Cut structurals, 3 ft. lengths	*72.00-73.00*
Heavy turnings	*59.00-60.00*
Punchings & plate scrap	*72.00-73.00*
Electric furnace bundles	*72.00-73.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Heavy breakable cast	50.00-51.00
Unstripped motor blocks	37.00-38.00
No. 1 machinery cast	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	71.00-72.00
Rails, 2 ft and under	*81.00-82.00*
Rails, 18 in. and under	*82.00-83.00*
Rails, random lengths	79.00-80.00
Railroad specialties	75.00-76.00

Stainless Steel Scrap

18-8 bundles & solids	470.00-510.00
18-8 turnings	380.00-400.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	64.50-65.50
No. 2 heavy melting	50.00-51.00
No. 1 bundles	64.50-65.50
No. 2 bundles	44.00-45.00
No. 1 busheling	64.50-65.50
Machine shop turnings	35.00-36.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Cut foundry steel	62.00-63.00
Low phos.	65.50-66.50
Cut structural plates 2 ft and under	71.00-72.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	65.50-66.50

Cast Iron Grades

No. 1 cupola	59.00-60.00
Charging box cast	52.00-53.00
Heavy breakable cast	50.00-51.00
Stove plate	55.00-56.00
Unstripped motor blocks	39.00-40.00
Brake shoes	47.00-48.00
Clean auto cast	57.00-58.00
Burnt cast	44.00-45.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	68.00-69.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	86.00-87.00
Rails, 18 in. and under	87.00-88.00
Rails, random lengths	83.00-84.00
Cast steel	71.00-72.00
Railroad specialties	77.00-78.00
Uncut tires	76.00-77.00
Angles, splice bars	78.00-79.00
Rails, rerolling	85.00-86.00

Stainless Steel

(Broker' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	115.00-120.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	57.00-58.00
No. 1 bundles	66.00-67.00
No. 2 bundles	49.00-50.00
No. 1 busheling	66.00-67.00
Machine shop turnings	36.00-37.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Low phos.	68.50-69.50
Electric furnace bundles	68.50-69.50

Railroad Scrap

No. 1 R.R. heavy melt.	69.00-70.00

CHICAGO

No. 1 heavy melting	*63.00-67.00*
No. 2 heavy melting	53.00-54.00
No. 1 factory bundles	68.00-69.00
No. 1 dealer bundles	*64.00-65.00*
No. 2 bundles	*48.00-49.00*
No. 1 busheling	*63.00-67.00*
Machine shop turnings	40.00-42.00
Mixed borings, turnings	42.00-44.00
Short shovel turnings	42.00-44.00
Cast iron borings	42.00-44.00
Cut structurals, 3 ft	70.00-71.00
Punchings & plate scrap	72.00-73.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*69.00-70.00*
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*85.00-86.00*
Rails, 18 in. and under	*87.00-88.00*
Angles, splice bars	76.00-77.00
Rails, rerolling	*88.00-90.00*

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	60.00
No. 2 bundles	40.00
No. 1 busheling	59.00
Machine shop turnings	31.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	64.00-65.00

Cast Iron Grades

No. 1 cupola	*49.00*
Charging box cast	*43.00*
Stove plate	*45.00*
Heavy breakable	*44.00*
Unstripped motor blocks	32.00
Clean auto cast	*54.00*
Malleable	*54.00*

BIRMINGHAM

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	46.00-47.00
No. 2 bundles	38.00-39.00
No. 1 busheling	46.00-47.00
Cast iron borings	*27.00-28.00*
Short shovel turnings	37.00-38.00
Machine shop turnings	36.00-37.00
Bar crops and plate	60.00-61.00
Structural & plate, 2 ft	*59.00-60.00*
Electric furnace bundles	54.00-55.00
Cut foundry steel	52.00-53.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	52.00-53.00
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*61.00-62.00*
Rails, 18-in. and under	74.00-75.00
Rails, rerolling	*80.00-81.00*
Rails, random lengths	69.00-70.00
Angles, splice bars	66.00-67.00

PHILADELPHIA

No. 1 heavy melting	*62.00-63.00*
No. 2 heavy melting	*55.00-56.00*
No. 1 bundles	*62.00-63.00*
No. 2 bundles	*53.00-54.00*
No. 1 busheling	*62.00-63.00*
Electric furnace bundles	*65.00-66.00†*
Mixed borings, turnings	*45.00-46.00†*
Machine shop turnings	*45.00-46.00†*
Short shovel turnings	*49.00-50.00†*
Heavy turnings	*59.00-60.00†*
Structurals & plates	*68.00-69.00†*
Couplers, springs, wheels	72.00
Rails, crops, 2 ft & under	81.00-82.00

Cast Iron Grades

No. 1 cupola	52.00-54.00
Malleable	68.00
Heavy breakable cast	57.00
Drop broken machinery	58.00-59.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	*47.00-47.50*
No. 1 bundles	53.00-54.00
No. 2 bundles	*45.00-46.00*
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*39.00-40.00*
Low phos. (structural & plate)	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	37.00-38.00
Heavy breakable	48.00-49.00

Stainless Steel

18-8 heets, clips, solids	475.00-485.00
18-8 borings, turnings	*315.00-340.00*
430 sheets, clips, solids	110.00-115.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*53.00-53.50*
No. 2 heavy melting	*39.50-40.00*
No. 1 bundles	*53.00-53.50*
No. 2 bundles	*38.00-38.50*
No. 1 busheling	*53.00-53.50*
Machine shop turnings	31.00-32.00
Mixed borings, turnings	*33.50-34.00*
Short shovel turnings	34.00-35.00
No. 1 cast	45.00-45.50
Mixed cupola cast	41.00-42.00
No. 1 machinery cast	46.00-47.00

BUFFALO

No. 1 heavy melting	59.00-60.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	59.00-60.00
No. 2 bundles	43.00-44.00
No. 1 busheling	59.00-60.00
Mixed borings, turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Short shovel turnings	36.00-37.00
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	68.00-69.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00-60.00
No. 2 heavy melting	49.00-50.00
No. 1 bundles	59.00-60.00
No. 2 bundles	43.00-44.00
No. 1 busheling	59.00-60.00
Machine shop turnings	39.00-40.00
Mixed borings, turnings	37.50-38.50
Short shovel turnings	42.00-43.00
Cast iron borings	37.50-38.50
Low phos. 18 in.	*66.00-67.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	*59.00-60.00*

Railroad Scrap

No. 1 R.R. heavy melt.	64.00-65.00
Rails, 18 in. and under	*80.00-83.00*
Rails, random lengths	*74.00-75.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	56.00
No. 2 heavy melting	*48.50*
No. 1 bundles	56.00
No. 2 bundles	*44.00*
No. 1 busheling	56.00
Machine shop turnings	*36.00*
Short shovel turnings	*38.50*

Cast Iron Grades

No. 1 cupola	*51.00*
Charging box cast	*46.50*
Heavy breakable cast	*46.50*
Unstripped motor blocks	*45.50*
Brake shoes	51.00
Clean auto cast	53.00
Stove plate	43.50

Railroad Scrap

No. 1 R.R. heavy melt.	*66.50*
Rails, 18 in. and under	*86.00*
Rails, rerolling	*90.00*
Rails, random lengths	*84.00*
Angles, splice bars	*72.00*

SEATTLE

No. 1 heavy melting	54.00
No. 2 heavy melting	51.00
No. 1 bundles	51.00
No. 2 bundles	31.00
Machine shop turnings	28.00
Mixed borings, turnings	28.00
Electric furnace No. 1	*62.00-65.00*

Cast Iron Grades

No. 1 cupola	*56.00*
Heavy breakable cast	*46.00*
Unstripped motor blocks	*48.00-50.00*
Stove plate (f.o.b. plant)	*40.00-42.00*

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	54.00
No. 1 bundles	54.00
No. 2 bundles	47.00
Machine shop turnings	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	62.00

SAN FRANCISCO

No. 1 heavy melting	54.00
No. 2 heavy melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	48.00
Drop broken machinery	60.00

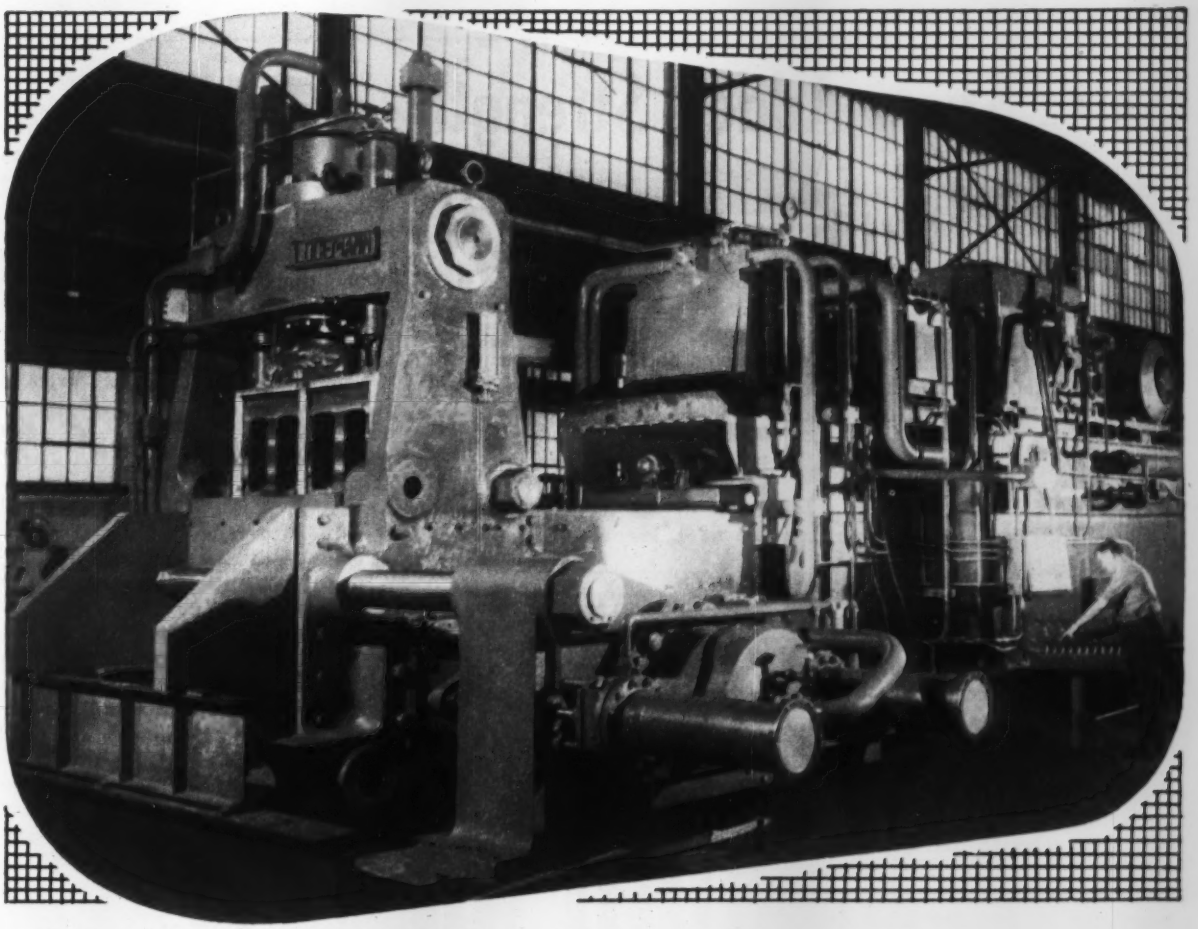
HAMILTON, ONT.

No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Bushelings, new factory: Prepared	50.00
Unprepared	46.00
Short steel turnings	35.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.ob., Hamilton, Ont.



A New LOGEMANN *Triple Compression* METAL BALING PRESS

★ COMPLETELY AUTOMATIC ★ MINIMUM INSTALLATION COST ★ TOP FILL
★ BOTTOM DISCHARGE CLEANS BOX EVERY BALE ★ RECORDS SHOW A 50 TO 55 TON SUSTAINED HOURLY OUTPUT OF HIGH DENSITY BALES

To meet the demands of modern automobile and body plants for automation, LOGEMANN has installed a number of these new type scrap presses for baling unprecedented tonnages of steel sheet-scrap. This unit can be adapted to other types of plants and other sheet metals with some modifications to suit the conditions and requirements of the user.

Hydraulic pressure for the operation of the main press rams is generated by two 150 H.P. opposed-cylinder pumps. One of the features of this bottom-drop press is the fact that loose chips, small slivers and punchings are cleared from the press box with each bale, instead of being retained within the box to possibly cause interference on subsequent bales.

OPERATION IS ENTIRELY AUTOMATIC. The supervising operator, with his electrical control-board, can be remotely located. In some cases, a closed circuit television screen is used to show operator the loading of press and hopper.

It will pay you to investigate the merits of this new unit. When making your inquiry, please give us the amount of tonnage required, and the nature of your scrap.

Write for further details.

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

Sales Show Added Strength

Nonferrous metals men are optimistic as December orders begin to flow in. Most November sales totals will be ahead of October results. Copper sales are off

Nonferrous Metal Prices, Pages 234 & 235

DECEMBER is shaping up as a peak month for lead, zinc and aluminum. Copper is still a question mark.

Lead, Zinc—Last week, the General Services Administration entered the market for both metals. Industry observers feel that only token offers of lead will be made to the government for the domestic stockpile. Zinc producers may be willing to offer more generous tonnages. But one primary zinc producer told STEEL: "The way our zinc sales have jumped in the last ten days, we will have little to offer the government."

Special high grade zinc sales are improving. Some producers report that sales to the die-casting industry have skyrocketed. Others are still waiting for customers to take more than minimum requirements.

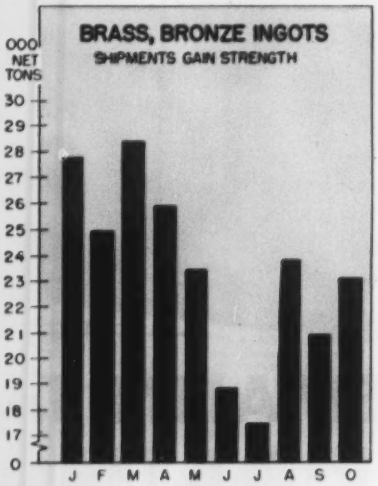
Lead sales are excellent. There is even some market tightness. December could be a record month.

Aluminum—Diecasters and fabricators are keeping orders flowing at a respectable clip. Strongest demand from diecasters should be felt during December and the first quarter of 1957. Only a few automotive orders were let during November.

There will be no shortage of aluminum. But points out one observer: "There is no need to worry. Just one additional application could eat up the excess—we have to have it available before giant industries will consider it for further use."

The last five expansion goals on which the aluminum industry could get fast tax write-offs have been closed by the Office of Defense Mobilization. ODM reports that the U.S. now has sufficient capacity to meet mobilization requirements for tubing, sheets and tapered sheets. We also have enough facilities to produce commercial and heavy aircraft forgings. This will have no dampening effect on aluminum expansion plans. Primary producers anticipated ODM's action.

Copper—Shipments of the red metal to the brass mill industry are at a low ebb. Reasons: 1. With the shortage over, customers can get prompt delivery and are not buying for long lead requirements. 2. As long as orders are trickling in, mills will continue to work off inventories and will let them get to the dangerously low point before ordering. 3. LIFO considerations are a thing of the past for most mills. This means there is no need for a mill to carry the same inventory it used to.



Source: Defense Council of the Ingot Brass and Bronze Industry

Foreign demand is slackening, too. The cutback in Great Britain and the continent (caused by the lack of oil) has depressed the market. The London Metal Exchange quotation hovers near 34 cents a pound. The U.S. price is 36 cents.

Tin Stays High

Middle East tension, coupled with a threatened tin strike at a Malayan tin smelter, has kept the price of the metal at about $110.50 a pound. While the closing of one smelter might not be too serious, industry observers point out that when one smelter closes, it is most likely that the remainder will close in sympathy with the strike.

Users continue to buy from hand to mouth, hoping for a break in the market which might send prices to more normal levels.

Market Memos

- Look for an increased demand for titanium extrusions during 1957. Jet engine manufacturers are impressed with the surface quality of experimental extrusions and will see if the same quality can be maintained on production runs.
- The government is wrestling with what to do about critical nickel supplies. A full report from ODM is in the offing.

NONFERROUS PRICE RECORD

	Price Nov. 28	Last Change		Previous Price	Oct. Avg.	Sept. Avg.	Nov., 1955 Avg.
Aluminum ..	27.10	Aug.	10, 1956	25.90	27.100	27.100	24.400
Copper	35.50-36.00	Nov.	28, 1956	36.00	38.365	39.500	44.420
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	15.300
Magnesium .	35.25	Aug.	13, 1956	33.75	35.250	35.250	32.500
Nickel	64.50	Nov.	24, 1904	60.00	64.500	64.500	64.500
Tin	110.625	Nov.	27, 1956	111.25	105.981	103.745	97.825
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	13.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

When you specify

AMERICAN ZINC

you have

4

SOURCES OF SUPPLY

Not just one, but four American Zinc plants are at your service. Under normal conditions each of these plants is prepared to make immediate delivery of slab zinc. If, for any reason one of the plants is unable to fill your order, another one will.

To further assure prompt delivery, and to keep pace with growing demand, production of all grades of zinc, from Prime Western to Electrolytic, has been increased.

You can always count on American Zinc to fill your needs with speed and precision.

HERE'S WHY WE CAN SERVE YOU BETTER

PLANT	BRAND	GRADE
DUMAS, TEXAS	GRANBY D	Prime Western Select Brass Special Continuous Line Galvanizing Grades
FORT, SMITH, ARK.	GRANBY A AMERICAN SPECIAL	Prime Western Brass Special
HILLSBORO, ILL.	GRANBY H	High Grade Intermediate Brass Special Prime Western Continuous Line Galvanizing Grades
MONSANTO, ILL.	AMERICAN ELECTROLYTIC	Special High Grade High Grade Special Alloys and Shapes Continuous Line Galvanizing Grades

American Zinc Sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 13, 28.90; No. 43, 28.70; 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb. f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 +%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $103-$108 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 110.625; prompt, 110.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.80 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 23.50-24.00; 5% silicon alloy, 0.60 Cu max, 26.00-26.25; 13 alloy, 0.60 Cu max, 26.00-26.25; 195 alloy, 26.00-26.50; 108 alloy, 24.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy). Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.35¢; l.c.l, 41.98. Weatherproof, 30,000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l. f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	113	97	118
Strip, C. R.	111	99	128
Plate, H.R.	107	96	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	120	190

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.80
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; 125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec grade, .032 in., 171.30; .081 in., 108.70 .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30 Thread plate, .188 in., 71.70; .250-2.0 in., 70.60 Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 14.00-14.50; old sheets, 11.00-11.50; borings and turnings, 7.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.63b	54.56c	....	57.82	32.000	32.000	31.250
Yellow Brass	49.44	40.17d	49.98	52.35	24.625	24.375	22.625
Low Brass, 80%	52.65	52.59	53.19	55.46	27.375	27.125	26.625
Red Brass, 85%	53.79	53.73	54.33	56.60	28.500	28.250	27.750
Com. Bronze, 90%	55.48	55.42	56.02	58.04	29.500	29.250	28.750
Manganese Bronze	57.13	51.23	61.47	....	23.000	22.750	22.250
Muntz Metal	51.44	47.25	....	....	23.125	22.875	22.375
Naval Brass	53.39	47.70	60.45	56.55	23.000	22.750	22.250
Silicon Bronze	61.44	60.63	61.48	63.36	31.250	31.000	30.250
Nickel Silver, 10%	65.16	69.20g	67.49	....	30.125	29.875	15.063
Phos. Bronze, A, 5%	76.25	76.75	76.75	77.93	33.000	32.750	31.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 11.00-11.50; industrial castings, 11.00-11.50.

Copper and Brass: No. 1 heavy copper and wire, 27.00-27.50; No. 2 heavy copper and wire, 25.50-26.00; light copper, 23.00-23.50; No. 1 composition red brass, 24.50-25.00; No. 1 composition turnings, 23.50-24.00; yellow brass turnings, 13.50-14.00; new brass clippings, 20.50-21.00; light brass, 14.50-15.00; heavy yellow brass, 16.00-16.50; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 18.00-18.50; cocks and faucets, 18.50-19.00; brass pipe, 19.50-20.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-14.50

Monel: Clippings, 75.00-90.00; old sheets, 75.00-80.00; turnings, 70.00-80.00; rods, 75.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.00-19.00; 3003 clippings, 18.00-19.00; 6151 clippings, 18.00-19.00; 5052 clippings, 18.00-18.50; 2014 clippings, 17.00-18.50; 2017 clippings, 17.00-18.50; 2024 clippings, 17.00-18.50; mixed clippings, 17.00-17.50; old sheets, 15.50-16.00; old cast, 15.50-16.00; clean old cable (free of steel), 18.00; borings and turnings, 15.75-16.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00.

Copper and Brass: No. 1 heavy copper and wire, 30.25; No. 2 heavy copper and wire, 28.75; light copper 26.25; refinery brass (60% copper) per dry copper content, 27.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 30.25; No. 2 heavy copper and wire, 28.75; light copper, 26.25; No. 1 composition borings, 27.00; No. 1 composition solids, 27.50; heavy yellow brass solids, 18.50; yellow brass turnings, 17.50; radiators, 21.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 54.29; oval, 53.42, 5000-10,000 lb; electrodeposited, 45.78; 2000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 128.50; 200-499 lb, 127.00; 500-999 lb, 126.50; 1000 lb or more, 126.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 76.20; 100-600 lb, 67.40; 700-1900 lb, 64.90; 2000-9900 lb, 63.20; 10,000 lb or more, 62.00.

Stannous Chloride (anhydrous): Less than 25 lb, 174.40; 25 lb, 139.40; 100 lb, 124.40; 400 lb, 122.00; 5200-19,600 lb, 109.80; 20,000 lb or more, 97.60.

Stannous Sulphate: Less than 50 lb, 136.80; 50 lb, 106.80; 100-1900 lb, 104.80; 2000 lb or more, 102.80.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(Concluded from page 193)

items are moving north.

St. Louis—Scrap continues scarce. Demand is stronger. Local mills are paying a premium of several dollars for material coming in from the outside. Prices have moved up steadily, ranging from 50 cents more for charging box and heavy breakable cast to $4 more for machine shop turnings.

Seattle—The market is steady. Domestic demand continues active, with mill inventories fair and consumption heavy. Receipts are reported satisfactory, current prices proving attractive to inland shippers. Electric furnace scrap is quoted at $62-$65, No. 1 cupola about $56.

Los Angeles—Demand is reported steady. Supplies are adequate, and inventories are building slowly. Auto wreckers are less active seasonally. The market undertone continues firm.

San Francisco—Ample supplies have been attracted by the near-record level of prices. Mill inventories are comfortable. Export demand is exerting a continuing upward pressure on the market.

WANTED TO BUY
STEEL DISTRIBUTOR
WAREHOUSE PLANT FOR CASH

REPLY BOX 494, STEEL
PENTON BLDG., CLEVELAND 13, OHIO

CLASSIFIED

Help Wanted

COMBUSTION OR INSTRUMENT TECHNICIAN for supervisory position in small integrated steel plant. Open Hearth and Heating Furnace experience preferred. Please state age, experience, and qualifications in reply to Box No. 493, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, age 41, graduate, 18 years plant layout, design, specifications, contract procedure and new construction, principally seamless and welded tube mills with related facilities and plant services. Engaged past ten years administrative staff work. Desires relocate as assistant or department head. Midwest or far west. Present salary five figures. Appropriate responses acknowledged. Reply Box 492, STEEL, Penton Bldg., Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $6,000 to $35,000. We offer the original personal employment service (established 46 years). Procedure of high standards individualized to your personal requirements. Identity covered. Particulars—R. W. BIXBY, Inc., 565 Brisbane Bldg., Buffalo 3, N. Y.

SPECIAL S & S SELECTION

From Stock of 2500 Machine Tools

16' x ¼" Niagara Shear—1942
16' x ¾" Birdsboro Brake—1940
5" Universal Boring Mill w/threading—1940
9" National Upsetter w/air clutch—1942
25' x ⅝" H & J #7 Roll
15' x 10' x 36' Betts Planer (extra heavy)
80" x ¾" Pels Shear
20" x 110" Vert. Mill & Die—(extra heavy)
Beatty #11B 350 ton Hvy Dty Punch—1945
#36B Pels Beam Shear—angles up to 6" x 6" x ⅝"
7'-17" Fosdick Radial Drill—1940
96" G&E Spur, Helical & Worm Generator
72" G&E Gear Enveloper
8" Barrett Hor. Boring Mill—Now in oper.
PLANERS: 120" x 60" x 22' D&H opnsde
72" x 60" x 24' D&H opnsde hvy dty wrm drv 3 motor drive, rapid traverse box tbl—pendant control

12' #3 H&J Pyramid Roll, drp end 2 mtr
13' Southwark Initial Roll, open end

S&S MACHINERY CO.
142 53rd St.
Bklyn 32, N. Y.
HYacinth 2-7400—Cable: Sandsteels

MOTORS—GENERATORS
TRANSFORMERS
NEW—REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT CO.
Phone Station Collect GL 3-6783
P. O. Box 51 Rochester, N. Y.

CASH
FOR USED TRANSFORMERS

Convert your used transformers to cash! Send us a description of them TODAY.
TRANSFORMERS AND COILS BUILT TO YOUR SPECIFICATIONS.
Send blueprints for prompt quotation.
TRANSFORMERS BOUGHT, SOLD AND REPAIRED
40 Years of Dependable Service

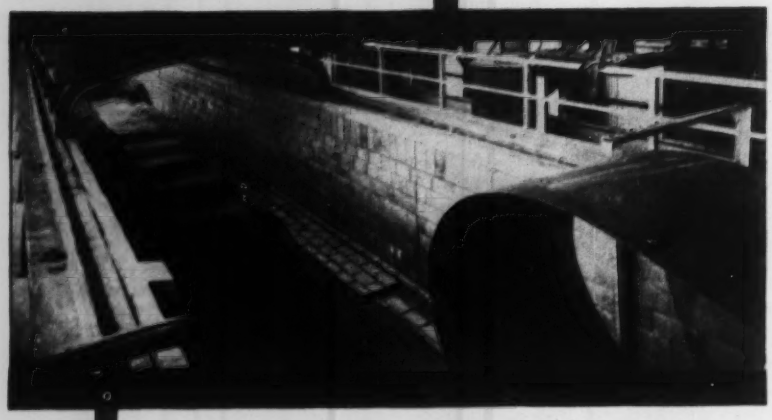
THE ELECTRIC SERVICE CO.
5329 Hetzel St., Cincinnati 27, Ohio

FOR SALE

Brand New Whistler Die Set-Up
1—40" x 137" Magnetic Type Die Set—11.851" Shut Height
2—Complete set of (8) Semi-steel Support Brackets for #100-10 Press Brake
3—490 pcs. Including Retainers, Punches & Bushings from .125 to .750, Strippers, Snap Rings and other pertinent parts.

INLAND ENGINEERING CO.
69 Glenmont Ave., Columbus 14, Ohio
Phone Amherst 3-8715

your corrosion problems solved



when you use ATLAS materials of construction

More than any other, the name, ATLAS, is specified for corrosion proof materials of construction throughout the metal working industry.

In this industry, Atlas materials, engineering and design features have accounted for tremendous savings in maintenance and replacements.

In the last quarter century, thousands of tanks have been built of Atlas materials for use by the metal working industry . . . all types, from small dip tanks to the largest continuous picklers.

Let Atlas help you solve your corrosion problems with the most complete available line of corrosion proof materials of construction in the country.

Atlas provides a complete corrosion service from on-the-spot technical advice through engineering design to complete construction facilities to carry the job from beginning to end.

- CEMENTS
- COATINGS
- LININGS
- RIGID PLASTICS

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

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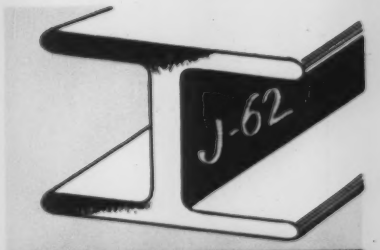

All over America... this crayon means

Vivid Permanent Markings

that remain clearly visible!

When you make your mark . . . on lumber, steel, iron, concrete, etc. . . . make sure it stays permanently visible by using Dixon Lumber Crayons or one of the line of Dixon Industrial Marking Crayons. Unequalled in quality and value, these sun-and-rainproof crayons are the standard of excellence throughout industrial America!

In Red, Yellow, Blue and 9 other highly visible colors

Sold everywhere in Mill Supply Houses, Hardware Supply Firms, Industrial Supply Distributors and Engineering Supply Firms. Be Sure To Specify:

DIXON

LUMBER CRAYONS!

THE JOSEPH DIXON CRUCIBLE CO.
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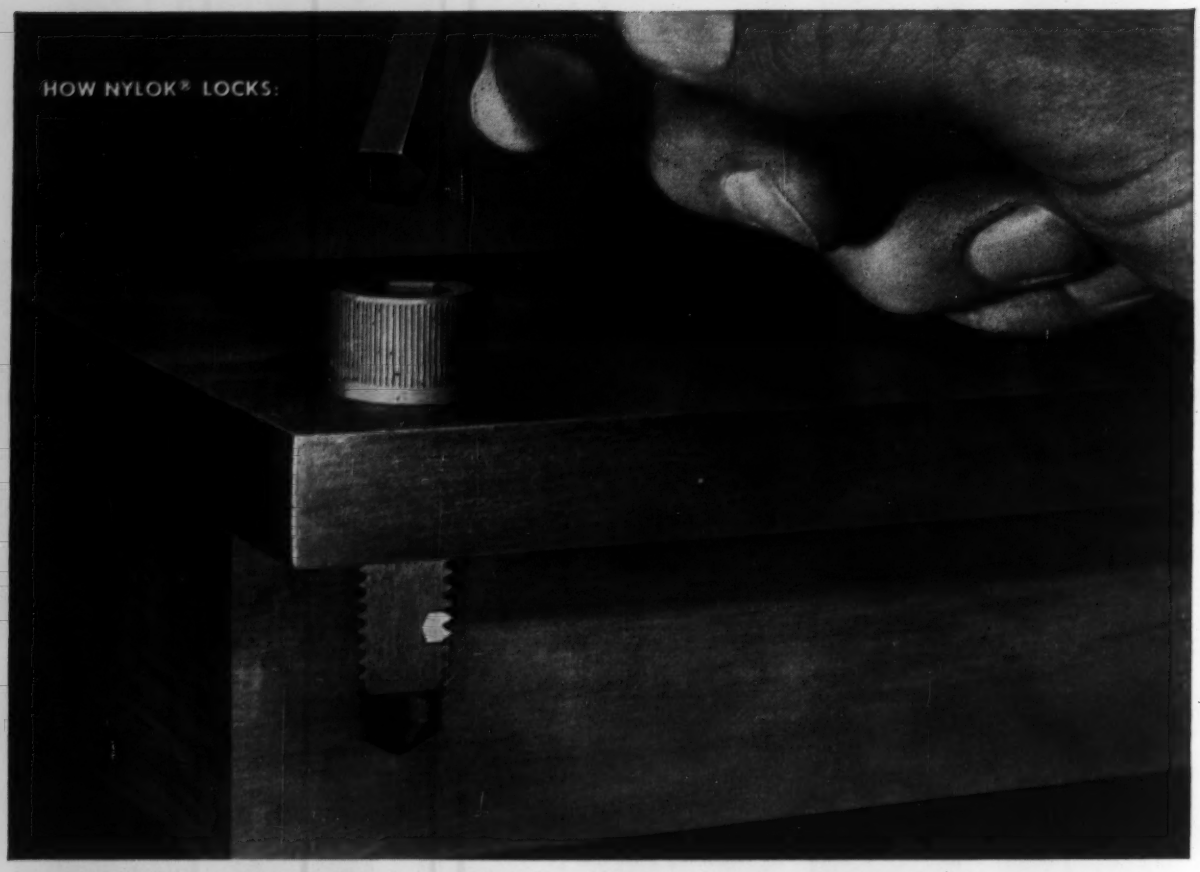


LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

NEW—self-locking UNBRAKO socket head cap screws

Self-locking UNBRAKO socket head cap screw.

They won't work loose. And they simplify design and save production time.

UNBRAKO socket head cap screws are now available embodying the Nylok* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 35, Pa.

T.M. Reg. U.S. Pat. Off., The Nylok Corporation

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

SIXTH OF A SERIES

Customer's Report

"We cut our Process Inventory by 40% when we switched to single stack annealing"

The cost of process inventory is just as much a capital investment in the annealing department as are the furnaces, buildings, etc. For example, one customer with a 50,000-ton-per-month operation found the Lee Wilson Single Stack Furnaces required $500,000 less in process inventory than did an equivalent four stack installation. A 40 percent reduction!

The answer: Lee Wilson Single Stacks have a much higher production rate. Using Single Stack furnaces, six pedestals can do the work required of 10 pedestals where four stack furnaces are used. This means fewer pedestals are needed to anneal a given tonnage, and correspondingly less steel required in the annealing department.

Here are dollars you cannot afford to overlook! Why not have a Lee Wilson engineer fill you in with all the facts on the most efficient annealing furnace ever developed — The Lee Wilson Single Stack.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS

Lee Wilson ENGINEERING COMPANY, INC.

20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

SINGLE-STACK RADIANT TUBE ANNEALING FURNACES

MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE STACK RADIANT TUBE FURNACES

The trend is to single stack. One of the nation's largest annealing departments recently put into operation 24 Lee Wilson Single Stack Furnaces and 72 bases.

Straightens tubes of standard wall thicknesses, in all grades, from 4½" to 16½"

...40 TIMKEN® bearings carry the load!

WHEN the Sutton Engineering Company built their new No. 5 M KTC tube straightener, they knew it had to give many years of rugged service despite heavy loads and constant use. So they mounted the two driven rolls, five idler rolls, speed reducer and table rolls on Timken® tapered roller bearings.

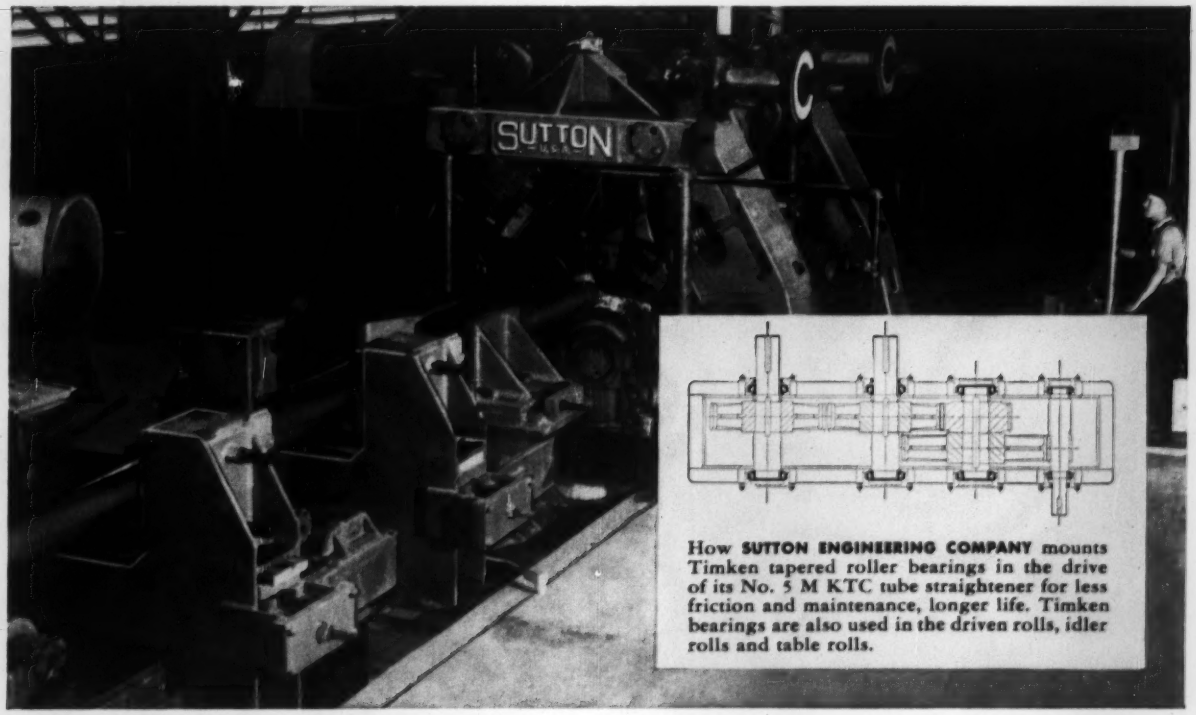
Timken bearings on the rolls easily handle the heavy radial and thrust loads as tubes up to 16½" pass through. That's because Timken bearings are tapered—take radial and thrust loads in any combination. No thrust bearings are required. And full line contact between rollers and races gives them extra load-carrying capacity. Timken bearings keep shafts in accurate alignment, assure smooth operation.

The compactness of Timken bearings permits a high load-carrying capacity in a relatively small-size bearing. Valuable space is saved.

Wear is held to a minimum because Timken bearings practically eliminate friction. They're designed by geometrical law to have true rolling motion. They're made with microscopic accuracy to conform to their design. And they're made of steel we make ourselves. We're the only bearing maker in the country who takes this extra step to insure quality.

To get all these advantages, always specify Timken bearings in the equipment you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **SUTTON ENGINEERING COMPANY** mounts Timken tapered roller bearings in the drive of its No. 5 M KTC tube straightener for less friction and maintenance, longer life. Timken bearings are also used in the driven rolls, idler rolls and table rolls.

IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

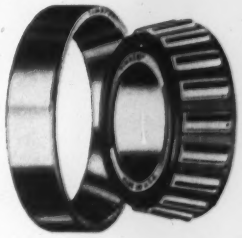
$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION